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BUREAU OF HYGIENE AND TROPICAL DISEASES.

TROPICAL DISEASES BULLETIN.

Vol. 37.] 1940. [No. 7.

SUMMARY OF RECENT ABSTRACTS.*

VI. PLAGUE.

Epidemiology.

UTTLEY (p. 307) points out that in Hong Kong climatic conditions of mean temperature 63°F., relative humidity 83° and aqueous vapour tension 0·500, favour the spread of plague. When these factors approach, respectively, 82°, 83° or more for 3 to 4 months and 0·900 the disease tends to die out. But as these factors have often prevailed in non-epidemic years it is necessary to look for other causes which govern the appearance of plague. The severity of plague has diminished everywhere in S. China irrespective of sanitary improvement.

RAO (p. 962) shows that the known factors of rat density, flea infestation and climatic conditions are favourable to the development of plague in Calcutta, and that deaths which may be due to plague are occurring in the bustees or groups of huts. Known sporadic cases occur but have attracted little attention and he argues that they are probably not imported, and that cases would be found if they were looked for. A systematic examination of the rodent population, including the bandicoots and others, is desirable. YANG *et al.* (p. 960) discuss the spread in Fukien of plague which was originally carried by rats and fleas in merchandise from seaports along the rivers to the interior. Rat communities on farms are rapidly exterminated in the epizootics and in areas difficult of access the epizootic may die out completely, but on the other hand villages may be sources of re-infection of new and susceptible rat populations in the towns. Over the whole province rat infestation is common. In Kenya, ROBERTS (p. 965) shows that the incidence of plague both in man and rats is more closely associated with the density of rat population than with any other factor.

ALFARADO and DE LA BARRERA (p. 962) note that in the Argentine one of the features of sylvatic plague is the small amount of human infection experienced, but that this is offset by the tendency to the production of pneumonic plague.

* The information from which this series of summaries has been compiled is given in the abstracts made by the Sectional Editors in the *Tropical Diseases Bulletin*, 1939, Vol. 36. References to the abstracts are given under the names of the authors quoted, and the pages on which the abstracts are printed.

Aetiology.

GIRARD (p. 310) states that more certain and quicker results are given in identification of *P. pestis* by subcutaneous injection of a suspension of test material in salt solution than by application to the shaved skin. CASTELLANI (p. 963) gives details of a rhamnose culture medium for the differentiation of *P. pestis* from *P. pseudo-tuberculosis rodentium*.

RAO (p. 963) shows that three amino-acids, proline, phenylalanine and cystine, are necessary for the growth of *P. pestis*, and that glycine, though not essential, acts as a stimulant. Accessory growth factors are not essential and there is little difference between virulent and non-virulent strains in nutritional requirements. SOKHEY (p. 976) also records similar findings.

ESKEY (p. 310) points out that *P. pestis* may retain its virulence for as long as four weeks in dried flea faeces.

TUMANSKY (p. 964) shows that *Proteus vulgaris* is antagonistic to *P. pestis*, which may explain how plague bacilli disappear in decomposing bodies, in which putrefaction is largely due to Proteus. RUSSO (p. 964), however, found that the plague bacillus may be recovered in pure culture from the bone marrow more than 10 months after the death of rats or guineapigs without contamination by Proteus. He points out the importance of bone marrow examination.

FAVORISSOVA (p. 965) describes the morphological modifications of the plague bacillus brought about by bacteriophage. BREININGER (p. 964) has investigated the action of calcium chloride on the plague bacillus.

Transmission.

In an epidemic in the Nilgiris, VINE (p. 307) shows that all the early human cases had definite association with some grain store or shop, and that infection travelled with bags of grain.

PISTONI (p. 311) reports on the rats and fleas of Eritrea and Scioa.

Rats.—SOKHEY (p. 976) shows that in Bombay in 1907 *R. rattus* and *R. norvegicus* formed 99 per cent. of the rodent population. Recently, however, *Gunomys varius* has increased to 30 per cent. of the total, and is highly susceptible to plague, whereas the other two species now show considerable resistance.

MORGAN (p. 313) details the procedure to be adopted in Britain for examining rats for plague.

Field rodents.—Much attention has been paid during the year to the problem of sylvatic plague and ESKEY and HAAS (p. 968) point out that the determination of the existence of plague infection in wild rodents is now a regular epidemiological feature in the western U.S.A. MEYER (p. 315) refers to the importance of sylvatic plague, which is a persistent infection in the rodents of California. Species of the genera Citellus, Marmot, Entamias, Cynomys, Peromyscus and Neotomia have been incriminated. ESKEY and HAAS (p. 968) show that although foci of wild rodent plague are widespread in California the absence of domestic rats accounts for the absence of epidemics in man. GIBBONS (p. 967) failed to find plague in a large number of wild rodents and their fleas in Alberta and British Columbia, but thinks it probable that sylvatic plague will spread from the western U.S.A. within the next few years.

VAN CAMPENHOUT (p. 966) found that *Mastomys ugandae* is the carrier concerned in a focus of sylvatic plague in the Belgian Congo,

near Lake Albert. ROBERTS (p. 965) on the other hand shows that sylvatic plague has not been found in Kenya though large numbers of field rats and fleas have been examined. He believes therefore that the theory that field rodents and their fleas are concerned with the spread of plague in Kenya appears to be incorrect.

RISTORCELLI (p. 312) reports on the rodents of Tunis.

RAMOS DIAZ (p. 310) shows that in the Peruvian mountains plague exists in the cui, a species of guineapig. *Pulex irritans* has adapted itself to the cui and it is thought that this flea transmitted plague to man in a small epidemic reported. In the Argentine, ALFARADO and DE LA BARRERA (p. 962) show that epizootics of sylvatic plague appear during the winter and fade out in spring; the infection is subacute and the dead animals may show few macroscopic signs. The rodents and fleas concerned are given.

KOROBKOVA *et al.* (p. 967) conclude from their work that agglutination reactions on the blood of spermophils are not useful in epidemiological investigations.

JELLISON (p. 968) proposes the view that predatory birds may be important in the spread of plague either by close association with rodents and their fleas (as with the booby owl and the ground squirrel, which occupy the same burrows) or by carrying diseased rodents or by passing infected faeces after eating diseased animals. The latter has been proved possible by experiment.

Fleas.—BUXTON (p. 308) describes a chamber devised for the study of *X. cheopis* living on a mouse under controlled conditions of temperature and humidity. The studies cannot be further abstracted but suggest that the number of fleas found on the animal bears no constant relation to the total population. The climate of rat holes and harbourages should be studied.

ESKEY and HAAS (p. 968) show that the degree of infectiveness for fleas of infected guineapigs bears a close relationship to the degree of bacteraemia present; no flea was infected by blood which did not also give a culture of *P. pestis*. ESKEY (p. 310) similarly points out that it is only shortly before death that the septicaemia of an animal is sufficiently intense to infect fleas, and that only blocked fleas are infective by bite. The period of infectivity is short since blocked fleas as a rule live only 24 to 48 hours [but see below]. It is probable that any flea may be a vector though *X. cheopis* and *Nosopsyllus fasciatus* are particularly active and dangerous. Probably all rodent fleas must be starved before they prefer human blood, and wild rodent fleas are not nearly so dangerous to man as *X. cheopis*.

ESKEY and HAAS (p. 968) consider that fleas are not found for long in abandoned burrows of field rodents. There is apparently little difference between wild rodent fleas and domestic rat fleas in the readiness with which they become infected, and once a flea is proved infected by transmission its average survival is only 3·2 days, whatever the species. A period, however, varying from 5 to 130 days, elapses before the fleas are infective by bite; this demonstrates that the fleas may harbour the bacilli in the gastro-intestinal tract for a long time, a fact of the highest importance in determining their efficiency as vectors [and in the epizoology of rodent and rat plague, ESKEY (p. 310) points out that although in his opinion the view that infection by means of flea faeces rubbed into the bite or into scratch abrasions has been discarded for man, it probably holds good for rodents and not only is the period during which infective faeces may be passed

long, but it should also be remembered that *P. pestis* may retain its virulence as long as 4 weeks in dried faeces].

ROBERTS (p. 965) found that although *X. cheopis* and *X. brasiliensis* were easily shown to be vectors, experiments with *Ctenophthalmus cabirus* and *Dinopsyllus lypusus* from field rats were failures.

For the determination of the existence of plague infection in wild rodents ESKEY and HAAS (p. 968) have found that inoculation of guineapigs with bodies of captured fleas is a more efficient procedure than systematic examination of killed rodents. Parasites killed with HCN are much more infective than those killed with chloroform or ether, and HCN should therefore be used before sending the fleas in 2 per cent. salt solution to the laboratory. This solution inhibits secondary organisms, prevents putrefaction and has no deleterious action on *P. pestis*. Another medium having the same action is described by DEVIGNAT (p. 969) who shows that Broquet's medium of calcium carbonate 2, glycerin 20 and distilled water 80, acts not only as a clearing agent for fleas, but ensures the survival of the bacilli up to 6 days and prevents putrefaction. He describes the procedure adopted in the Belgian Congo in examining fleas and the bone marrow of rats with the help of this medium.

TIFLOV and POTAPOV (p. 973) show that all species of fleas which occur on ground squirrels migrate from abandoned burrows, and the experiments carried out appear to suggest that the maximum migration takes place within a month or two of the elimination of the rodents from the burrows.

RUSSO (p. 965) found that a number of invertebrates, including flesh eating flies of the genus Sarcophaga, may contract plague and may become intermediate sources for the conveyance of infection. Acari living on mummified rats may become infected owing to the long survival of *P. pestis* (p. 964).

Clinical Findings and Treatment.

ROBIC and MINEC (p. 313) report a case of bubonic plague in which intramuscular abscesses developed. From one a pure culture of *P. pestis* was obtained; from the other *P. pestis* and *Staphylococcus albus* were recovered. Association of *P. pestis* with a streptococcus in gland juice is recorded by FARINAUD (p. 970), but in this case streptococci alone were found in several buboes from other sites at an earlier stage and it is thought that the primary infection was therefore due to the streptococcus.

MURDOCK (p. 969) describes an outbreak of pneumonic plague in a hospital in which there were 15 deaths in 16 cases, many occurring in the attendants of the first patient, nurses, and doctors. Diagnosis was made retrospectively by examination of bone marrow from an exhumed corpse.

SOKHEY (p. 976) reports that of 124 cases of plague 69 were treated with anti-plague serum and 55 with intravenous iodine; the mortality in the former was only 27 per cent. compared with 65 per cent. in the latter.

Sulphonamides.—DURAND (p. 970) has investigated the protective action of M. & B. 693 in mice. About 2 mgm. per gm. was ingested daily and the mice were inoculated on the 5th or 6th day, the drug treatment being continued afterwards for 6 to 17 days. The mice were able to withstand 10,000 lethal doses but with 20,000 to 300,000 most of them died, although no bacilli could be recovered from them.

It was found that the mice protected by the drug developed immunity in proportion to the size of the test dose of bacilli. With doses of the drug reduced to 0·5 mgm. per gm. the protective action and sterilization were imperfect. GIRARD and GIRARD (p. 971) obtained similar results in mice and guineapigs with M. & B. 693. SCHÜTZE (p. 971) shows that white mice all succumb to a dose of about 100 *P. pestis*. He found that sulphone in mice and soluseptasine in rats had protective value but that M. & B. 693 was more potent than either in both animals. Serum prepared by injection of the Otten strain of *P. pestis* also protected in large doses, but though the results were good the author considers that possibly a combination of serum and drug may prove superior to either alone.

Prevention.

SILVETTI (p. 977) would confine anti-plague measures in the Argentine to providing for the sick, segregation of contacts, disinfection and deratization. He considers that vaccination produces an undesirable negative phase and is only protective for a short time. Serum therapy is apt to produce allergic disease.

Rat-proofing, etc.—In Java the house improvement programme continues and ROSIER (p. 974) reports 32,318 houses dealt with in the year 1937. In some parts of the improved areas plague has reappeared on a small scale, but is easily controlled by deratting and restoration of the improved houses. Over 50,000 new houses have now been built under anti-plague supervision. Vaccination continues and during the year the numbers of cases and deaths have fallen satisfactorily.

YANG *et al.* (p. 960) in Fukien instituted for shops rat-proofing measures which were calculated to take into account the protection of (1) bulk stock, (2) replenishment stock, and (3) retail goods. This organization proved to be efficient and kept the total costs of the campaign very low. In the *Boletin Sanitario* (p. 962) it is shown that ordinary anti-rat methods have resulted in a diminution of rats in the ports of the Argentine in some cases by as much as 70 per cent.

In Hawaii (p. 973) the use of poison bait has been successful, the poison being banana loaded with phosphorus. BAHR (p. 978) writes of the value of ratin cultures, which have remained very constant for 31 years and which give a rat mortality of 60 to 90 per cent. The squill preparation ratinin is also useful but is not satisfactory against mice in the preparations used.

Fumigation.—MEYER (p. 315) reports that trapping of field rodents over small areas is followed within two months by recovery to a considerable fraction of the original numbers and that rodent control over a narrow belt is soon followed by re-invasion. Methylbromide at the rate of 10 cc. per burrow opening is very efficient in controlling both rodents and fleas. STEWART and MACKIE (p. 316) also report on the efficiency of methylbromide against rodents and fleas but point out that it is dangerous to man since it is colourless, odourless and poisonous. It does not render food materials toxic, however, and can therefore be used for the fumigation of cargoes. They emphasize the importance of killing off fleas which are not only vectors but also reservoirs of the disease [see ESKEY and HAAS above].

BABENUISHEV *et al.* (p. 972) note that the number of fleas in the burrows of ground squirrels is reduced as a result of fumigation with chloropicrin or calcium cyanide. In an outbreak in the Nilgiris VINE (p. 307) states that Cyanogas and Calcid were used as disinfectants and

Shelltox and Flit as pulicides. In Fukien, YANG *et al.* (p. 960) treated rat burrows with calcium cyanide and distributed poison bait in the houses.

General.—For the protection of anti-plague workers against fleas and the poison gas used in disinfestation BHARGAVA (p. 971) recommends white clothing preventing any access to the skin, the use of long thick rubber gloves, or the smearing of arms and legs with kerosene soap emulsion, and vaccination. Hours of work should be short and workers should be in pairs to keep a watch for fleas. He notes that Cyanogassing by means of Calcid briquettes is relatively safe. MEYER (p. 315) gives advice on the control of sylvatic plague. From the personal point of view he emphasizes the importance of gland puncture in diagnosis, the use of antiplague serum, the quarantining of rodents before sale, the avoidance of rodents in general and the rodent-proofing of summer houses. Noteworthy rodent mortality should be reported and diagnosis may be made by mass inoculation of tissues or fleas by the pool method. Reference is made to the skin tests and serological procedures used in Russia.

Vaccination.

With living organisms.—In a study of the avirulent E.V. strain of *P. pestis* isolated by GIRARD in Madagascar, ANCHEZAR (pp. 313, 976) arrives at the following conclusions:—the strain is identical with *P. pestis*, it is avirulent for the very susceptible guineapig in moderate doses but in large doses (of 250,000 million organisms) causes death by toxic action in guineapigs and rats, it has selective effect on lymph nodes and spleen, is temporarily present in blood and bone marrow and persists for some time at the site of inoculation, and the inoculation gives rise to local inflammation and temporarily to more generalized lesions.

GIRARD and ROBIC (p. 314) record over 2,000,000 vaccinations with E.V. in Madagascar during 1935 to 1937 with, it is claimed, a reduction in plague mortality of 80 per cent. PASSA (p. 314) shows that in Madagascar the cases of plague fell from 3,493 in 1935 to 918 in 1937. ROBIC (p. 314) quotes similar figures and shows in a graph how the incidence has fallen in relation to the vaccination campaigns. VOGEL and RIOU (p. 975) refer to the same work and show that in one area 77·5 per cent. of the population were vaccinated in a short period.

In Java vaccination with Otten's living vaccine continues and ROSIER (p. 974) reports 1,804,234 inoculations during 1937, most of which were reinoculations. He attributes the steady decline of plague in the first place to the vaccination campaign, but, of course, the long term policy of house improvement is continued.

With dead organisms.—SCHÜTZE (p. 974), working with vaccines of organisms killed at 55°C. for 15 minutes, found no superiority in rats and mice of virulent strains over avirulent or of smooth over rough. Strains grown at 37°C. and therefore containing more envelope antigen give maximal protection to rats in which the test dose is large and toxic, but in mice in which the test dose is small and invasive the envelope antigen appears to play a smaller part. Some other antigen is therefore concerned. The superior protective power of a smooth avirulent living vaccine depends upon its capacity for survival in the animal, which is longer than that of a rough strain. SOKHEY (pp. 976, 977), however, finds that vaccines made from broth cultures are more potent when incubated at 27°C. than at 37°C., though the reverse holds good for agar

cultures. Killing by heat at 55°C. for 15 minutes is better than the use of phenol or formalin. Trials of living avirulent strains have disclosed great variations in protective power from high values to none. The antigenic values of a large number of virulent strains, however, were very constant.

In Brazil, BARRETO (p. 977) uses killed vaccines, of which he gives details, but no work to assess their value is quoted. *C. Wilcocks.*

HELMINTHIASIS.

Précis of Abstracts in this Section.

Technique, general surveys and immunity.—LANE (p. 477) quotes his findings which show that the straining of faecal suspensions causes a loss of eggs of worms which invalidates egg counts made on strained suspensions and outweighs the advantages to be gained by clearer preparations. He shows that pouring off causes a loss of eggs and that the strength of solutions of salt for floatation needs to be varied according to the kind of eggs concerned, and he states that the shape of the vessel in which floatation is carried out, the technique of lifting off the cover slip, and the examination of the preparation as a hanging drop without reversal of the cover slip are important in maintaining the efficiency of the D.C.F. process.

SMITH *et al.* (p. 478), working in Alabama, show once more that the heaviest hookworm rate was found in places with sandy soil, the lightest in those with clay. The Cellophane swab is more efficient than the Willis technique in detecting Enterobius infection. MILLER (p. 478) shows that, in general, the heavier the worm load, the fewer eggs does each female produce.

GIOVANNOLA (p. 479) reports on intestinal worms in Sardinia. SENEKJI *et al.* (p. 479) record the intestinal protozoa and worms found in a survey in Iraq. DE MEILLON and HOLLAND (p. 480) report on intestinal worms found in patients in Zululand; hexylresorcinol is used in treatment. JADIN and DELPERDANGE (p. 480) give the results of a worm survey in man and animals in Coquilhatville. CRAM and FOLAN (p. 480) record the intestinal worms found in school-boys in the United States.

CHANDLER (p. 481) discusses local immunity in parasitic infections and points out that it should not be confused with general immunity. With regard to most intestinal helminthic infections local immunity is of two kinds, the reaction to parenteral migration or mucosal burrowing of larvae, and the reaction to adult parasites in the intestine. The latter is largely influenced by the feeding habits of the parasites.

Trematodes. Schistosomes.—VAN DEN BERGHE (p. 482) discusses schistosomiasis in the Congo, giving figures of the incidence in different parts. He is inclined to regard *S. intercalatum* as a subspecies of *S. haematobium*, and finds no evidence of the existence of the species named *S. faradjei* by WALKIERS. In a village in which infection with *S. mansoni* was common the clinical picture resembled that produced by *S. japonicum*, but in this place no Planorbis and few other snails were found.

MOZLEY (p. 483) has studied the snail hosts of *Schistosoma haematobium* and *S. mansoni* in Zanzibar and Tanganyika Territory, where from 10 to 70 per cent. of the natives are infected. He advocates control of the snails by drainage, flushing, poisoning (by preparations of local plants) and vegetation, which, if completely covering the surface of water, appears to restrict the snail population. SCOTT (p. 484) shows that in Venezuela the snails concerned in *S. mansoni* infection are not found in rivers but in the more slowly running irrigation channels. The rate of human infections is high and is particularly so in those who work in connexion with the irrigation. Control should be through the rebuilding and maintenance of drains and canals, intermittent use of these and improvement of rural sanitation.

GIOVANNOLA (p. 485) discusses the intermediate hosts of *S. mansoni* in Eritrea. BARLOW (p. 485) shows that there is a seasonal fluctuation in the infestation rate of snails with human schistosomes, with diminished infection during the winter, and states that this may have a bearing on control measures. PALLARY (p. 485) shows that excess of magnesium salts in the water of part of N. Africa appears to be related to the absence of Bulinus and Planorbis.

MAINZER (p. 485) finds that in *S. mansoni* infections, as in *S. haemotobium*, latent pulmonary involvement is usually present even in the absence of pulmonary symptoms, and that X-ray reveals it about 3 months after infection. He describes the X-ray appearances and states that antimony treatment appears to have no effect on the development of the lesions. BAYOUMI (p. 486) reports a case of bilharzial myelitis.

PANAYOTATOU (p. 486) has used anthiomaline with success in urinary schistosomiasis. In studying the electrocardiographic changes during treatment with tartar emetic, MAINZER and KRAUSE (p. 487) found changes, together with bradycardia, which are the result of drug intoxication of the heart muscle and which may exceptionally result in auricular fibrillation and sudden death.

BONNE and SANDGROUND (p. 487) found eggs of *S. japonicum* in a large proportion of natives in Central Celebes, but found no infected snails. No dysenteric symptoms were produced by the infection. BARTSCH (p. 488) claims that *Oncomelania yaoi* n. sp. is a host of *S. japonicum*. KATO (p. 488) describes a method of collecting the cercariae of *S. japonicum* which escape from snails.

The Committee on Water Pollution, Wisconsin (p. 488) advocate the use of copper carbonate for eliminating snails harbouring cercariae responsible for swimmers' itch in recreational bathing areas.

Others.—HSÜ (p. 489) has studied the cells and inflammatory products found in the intestine of various flukes and presumably ingested during feeding. LANE in comment points out that plasma or lymph must also have been ingested.

GALLIARD (p. 489) reports on the molluscan and fish hosts of *C. sinensis* in Tonking. MIYANAGA (p. 489) reports 6 species of fish found to harbour cysts of *C. sinensis* in the Mukden area. KATO (p. 490) reports on fouadin and Sizze A in experimental infection with Clonorchis.

KINUGASA (p. 490) discusses infection with Paragonimus in the Sintiku Prefecture.

BONNE (p. 490) reports 7 cases of infection with *Echinostoma ilocanum* discovered at autopsy in Celebes and names the first and second intermediate hosts (of which the most important are mussels).

The worms were present in the jejunum and the main symptoms were diarrhoea and slight abdominal pain but in the 7 cases the cause of death was independent of the infection. He discusses the cercariae. BONNE and SANDGROUND (p. 491) found heavy infection rates by stool examinations in villages in Celebes. All mussels taken from Lake Lindoe close to these villages were found to carry large numbers of metacercariae, and they are eaten largely by the natives after a primitive boiling process. *C. W.*

LANE (Clayton). **Hookworm Diagnosis. Assumptions, Alterations, Controls, Time-Lag, Rediscoveries: D.C.F.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1940. Mar. 20. Vol. 33. No. 5. pp. 521–536. With 1 fig. [20 refs.]

This is the paper referred to in the note [this *Bulletin*, 1940, Vol. 37, p. 65] that follows abstracts of 3 papers from New Orleans. In one of these papers it is stated that " Lane's D.C.F. technique is recognized to be both qualitatively and quantitatively very efficient for the concentration of helminth eggs;" it is pointed out in this one that these authors' own results got by their adaptation of D.C.F. seem hardly to merit this high praise, and it is asked whether or not the real D.C.F. does so.

The appraisement of various techniques by the New Orleans writers was based on strained faecal suspensions, and the techniques were graded by the different kinds of infections each disclosed from these. Of their efficiency in estimating weights of infection (information which a medical man may rightly expect from a laboratory) there was no report. For this purpose egg counts have been used for 50 years, indeed it was these that pointed Looss to the skin route of hookworm infection; for grading techniques egg counts date from 22 years ago when Lane used them for valuing " levitation." To obtain a clearer field he too at that time used a strained faecal suspension, but the use of hookworm egg counts to appraise D.C.F. showed 16 years ago that straining had reduced the egg collection to between 31 and 43 per cent. of that certainly present, that is of those got from unstrained suspensions; yet the New Orleans workers held that the sieve itself had little or no effect in retaining hookworm eggs. At least there is retention on it, and the stickiness of hookworm eggs presumably has a share in causing it. This property was discovered by PEPPER 32 years ago, rediscovered by Lane 22 years ago and by him used for his levitation technique, in the course of appraising which by egg counts there occurred an instance in which 2,227 of 2,336 hookworm eggs remained sticking to the slide when levitation had lifted off almost all other faecal matter. It was, indeed, to get rid of this stickiness that STOLL 17 years ago used a caustic soda solution in his counting technique. In Lane's experience the loss of hookworm eggs on straining has far outweighed the obvious advantage of a clearer preparation.

Contrasting the details of the real and of the adapted D.C.F., Lane showed 16, and again 15, years ago that the single pour-off of D.C.F. caused a loss of hookworm eggs amounting to between 0 and 25 per cent.; in the adapted technique there are repeated pour-offs with washings and centrifugings between, and the report ignores the question of any possible loss thereby caused. In valuing D.C.F. Lane found that the salt and the strength of its solution used for floatation should vary with the kind of egg to be lifted. Thus for hookworm eggs

solutions of s.g. 1,150 and 1,200 were equally effective ; while for those of Ascaris this must be 1,300 (got in Lane's work by calcium chloride) for effective delivery, when it was 1,200 the egg delivery dropped from this figure to a half and when 1,150 to a twenty-fifth ; for the adapted technique a specific gravity of 1,180, got by zinc sulphate, was held satisfactory, without evidence offered as to its worth in floating parasites regardless of their specific gravity. Again egg counts showed Lane that the size and shape of the floating fluid influenced egg collections ; in the adapted technique using a " Wassermann tube," these points are in doubt for workers in Britain. In the success of the real D.C.F. a square cover, rapid lift, the examination of the preparation as a hanging drop are important ; in the adaptation the cover was round, the lift was left partly undetermined in kind and the cover was laid on a slide. When in the adapted technique the preparation was stained it was reversed ; reversal being no part of the real D.C.F. the effect of this in spilling eggs in the deep hanging drop got with rapid lift was not tested, but in the larger Willis preparation taken from a solution with s.g. 1,200 the average loss of hookworm eggs on reversal was 56 per cent. and of Ascaris eggs 43 per cent. In no instance, then, was evidence offered that any adaptation made in New Orleans was for the better ; some were certainly for the worse. " If, in their experience, this technique, when altered for the worse, still merits the high praise they have mentioned, the real D.C.F. seems worthy of more serious attention than it has received in that city."

Clayton Lane.

Smith (W. H. Y.), Gill (D. G.) & McAlpine (James G.). **Intestinal Parasite Survey in Alabama.**—*Southern Med. Jl.* 1939. Nov. Vol. 32. No. 11. pp. 1094–1104. With 4 maps & 5 charts.

This survey, carried out from 1934 to 1937, completes the authors' preliminary report [this *Bulletin*, 1937, Vol. 34, p. 874].

All faecal specimens were examined by the Willis gravity floatation method and egg counts were done by that of the Caldwells. In all, 253,630 persons were examined. Hookworm infection was detected in 15·3 per cent., whites being consistently more highly infected than coloured persons, and the infection rate varying as usual with the nature of the soil ; in the sandy zone its percentage averaged 34·9, in the zone with sand and clay 18·6, in the zone with clay 4·4. The discovered Ascaris infection rate was 1·1 per cent. That for *Hymenolepis nana* was 1·4, it was higher in the white than in the coloured group and lessened with age. Trichuris infection was found in only 105 (0·04 per cent.). In an institution for mental defectives 415 of 637 (65·15 per cent.) were found infected with Enterobius when Hall's Cellophane swab and the Willis method were both used, but the latter disclosed 16 only ; about three-quarters of those finally detected by repeated swab examinations were found in the first of these.

C. L.

Miller (Max J.). **The Egg-Count Index of *Trichocephalus vulpis* Infections in Dogs.**—*Proc. Soc. Experim. Biol. & Med.* 1939. Oct. Vol. 42. No. 1. pp. 301–303.

Although the worm-egg ratio in this whipworm of the dog (as determined by egg counts of faeces and counts of worms got from the

intestine of the killed hosts) has a doubtful validity for the parasite of man, it at least serves once more to illustrate that there is no fixed ratio for a worm species, but that in general the heavier the worm load the fewer eggs does each female produce. *C. L.*

Giovannola (Arnaldo). Alcune osservazioni sulla diffusione delle elmintiasi umane in Sardegna. [**Notes on Worms in Man in Sardinia.**]—*Rendiconti Istituto di Sanità Pubblica.* Rome. 1939. Vol. 2. Pt. 2. pp. 407–414. With 2 figs.

The paper deals with intestinal worms. After noting previous reports, there are given the findings in 209 faecal examinations, namely *T. trichiura* 42, *A. lumbricoides* 16, *E. vermicularis* 2, *H. nana* 10. The method of examination was to pick out from the faeces gross undigested matter and sieve the rest by pressure. Part of the sieved matter was put in a conical vessel with water; another part was set in a petri dish which was filled to the brim with a saturated solution of common salt and covered by glass laid on it. Each preparation was stood for 15 minutes, after which the sediment from the first was pipetted off; from the second the covering glass was rapidly lifted, reversed and a coverglass applied. No mention has been found of important matters—for instance, the measures taken to verify saturation of the salt, to particulate the faeces, to determine that the limit of effective concentration was not exceeded, and whether there was effected avoidance of the common loss of fluid (and eggs) on reversal of the collecting glass. [See also Lane above.] *C. L.*

Senekji (H. A.), Boswell (C.) & Beattie (C. P.). **The Incidence of Intestinal Parasites in Iraq.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1939. Nov. 25. Vol. 33. No. 3. pp. 349–352.

Of 1,000 faecal examinations in Iraq, 84·5 per cent. were found positive for intestinal animal parasites. Besides that, urinary schistosomiasis and hydatid disease are common.

Specimens were forwarded to the laboratory with the least possible delay and without preservative. There they were examined by four methods: (1) a wet film in "saline," (2) an iodine stained wet film, (3) a film obtained by "the brine floatation technique," (4) two slides fixed in Schaudinn's alcohol sublimate and stained by Heidenhain's iron haematoxylin. Nearly all specimens were from apparently healthy young adults. Of the examined 55·6 per cent. were infected with potentially pathogenic organisms, that is with helminths or *E. histolytica*. The actual percentages of detected infections were: protozoa 73·9, *E. histolytica* 22·9, *E. coli* 49·3, *E. nana* 18·1, Iodamoeba 19·1, Giardia 8·5, Chilomastix 8·8, Trichomonas 0·5, *D. fragilis* 0·2. The percentages positive for helminths were 41 in all, *Ancylostoma duodenale* 25·6, Ascaris 13·6, Enterobius 1·6, Strongyloides 0·7, Trichuris 3·4, *H. nana* 2·1, "*Taenia saginata*" 0·6, Dicrocoelium 0·1. All adult hookworms examined were *A. duodenale*; this infection was highest (46·3) and Ascaris infection lowest (8·9) in Baghdad Liwa, excluding Baghdad City, while *E. histolytica* was higher in the City (34·4) than anywhere else. *C. L.*

DE MEILLON (Botha) & HOLLAND (E.). **Helminthological Notes from Zululand.**—*South African Med. Jl.* 1939. Dec. 23. Vol. 13. No. 24. pp. 798–802. With 2 figs. [18 refs.]

"Stools were usually collected from hospital patients . . . . Four specimens were prepared from each stool, two by the usual floatation method in saturated salt solution and two by precipitation with a centrifuge after thorough mixing in water."

Ascaris infection was the commonest, then Trichuris, then hookworm and Taenia species. Ascaris causes more disability among Zulu children than any other helminth; there is instanced a boy of 14 with intestinal obstruction, two feet of the small intestine being packed with 476 of them, about 40 being passed later; the strength of the argument for air-borne infection [this *Bulletin*, 1934, Vol. 31, p. 605] is accepted. Taenia infection was found to be a serious complication of amoebic dysentery which latter could not be cleared up till the worm had been expelled. Heterodera and Fasciola eggs come in the list of those certainly or probably swallowed in food. Hexylresorcinol was used as the drug of election, though there were two instances of profound shock after it, both recovering. One of the two unidentified eggs, illustrated, seems to be that of Trichostrongylus. *C. L.*

JADIN (J.) & DELPERDANGE (G.). Contribution à l'étude de l'helminthiase et de la parasitologie de l'Equateur. [**Worm and Parasite Infections on the Equator.**]—*Ann. Soc. Belge de Méd. Trop.* 1939. Dec. 31. Vol. 19. No. 4. pp. 547–556.

Examinations were made at Coquilhatville on man and animals. Those on man are as follows, as shown by at least three microscopic examinations of stools—presumably by smear since it is stated that enrichment technique would without doubt have given higher figures. The number of examinations made in 1937 were 4,776, and in 1938 were 4,511, while the percentages of infection found were respectively in these years: hookworms 43 and 53, Ascaris 25 and 26, Trichuris 14 and 12, Strongyloides 11 and 10. In addition the actual finds in smaller numbers and over the whole period were: *Schistosoma haematobium* 32, *S. mansoni* 7, *D. dendriticum* 3, *Schistosoma bovis*, 3, *D. latum*, 2, *H. nana* 1, *T. saginata* 1, *T. colubriformis* 1. *L. loa* and *A. perstans* are fairly frequent. *C. L.*

CRAM (Eloise B.) & FOLAN (John P.). **Intestinal Helminths found in Boys recently arrived in Washington, D.C., from Various Parts of the United States.**—*Rev. Med. Trop. y Parasit.* Habana. 1939. Sept.–Oct. Vol. 5. No. 5. pp. 243–256.

The results of examination of 364 white and 249 negro boys who had recently arrived at the National Training School for Boys from all parts of the United States.

For threadworms the examination was by the N.I.H. swab, for others the faeces were examined by the Willis gravity floatation method using a saturated solution of common salt. The swab examinations numbered 1,191 on 303 boys, each being examined 2 to 7 times, and this is compared with an earlier series of 303 boys each examined by one swab. This multiple examination gave an incidence 1·6 times greater in whites and 2·4 times greater in negroes than did a single swab. The total detected incidence in 606 was 12 per cent. In 594 faecal examinations

the number of positives for 357 white and 237 negro boys respectively were : Ascaris 7 and 3, Trichuris 19 and 4, Necator 48 and 8, Enterobius 5 and 0, *Hymenolepis nana* 2 and 4, Taenia species 1 and 0. *C. L.*

CHANDLER (Asa C.). **The Nature of Local Immunity in Parasitic Infections.**—Reprinted from *Volumen Jubilare Pro Prof. Sadao Yoshida*. Osaka, Japan. 1939. Mar. Vol. 2. pp. 343–364. [44 refs.]

The author's conclusions are as follows :—

" 1. Local immunity should not be confused with general tissue immunity or locally manifested general immunity. The immunity in malaria appears to belong to the latter category. Parasites in the circulatory systems, enclosed body cavities, or embedded in internal tissues would not be expected to give rise to local immunity, whereas parasites located in skin, in the lumen or lining of the intestine, or in the lumina or lining of biliary, urinary, genital, or respiratory passages may do so.

" 2. Local immunity as described in bacterial infections is sometimes dependent upon cell mobilization and may not always be strictly specific.

" 3. A local immunity to toxic effects has been demonstrated in the screw-worm (*Cochliomyia americana*) infections.

" 4. A different type of local immunity, directed against the nutrition and vitality of the parasites, has been demonstrated in infections with the African skin maggot, *Cordylobia*. The development of this reaction in *Cordylobia* and not in *Cochliomyia* infections is believed to be due to subsistence on living tissue in the former and in proteolyzed tissues in the latter. It is suggested that other tissue-feeding parasites may be independent of functional immunity, the host tissue modified by digestion serving as an antigen.

" 5. A true local immunity, entirely independent of the presence or absence of a general immunity accompanied by an antibody response, occurs in Coccidian infections. The functional immunity apparently depends upon failure of nutrition of the parasites, and a sloughing off of the cells injured by invasion of the sporozoites.

" 6. There is as yet insufficient evidence for the development of a local immunity in amebic infections.

" 7. In most helminthic intestinal infections there are two phases of immunity : (1) a reaction to parenteral migration or mucosal burrowing of the larvae before they grow to maturity, and (2) a reaction to the adult parasites in the intestine. Parenteral migration, such as occurs in hookworms, *Nippostrongylus*, *Strongyloides*, and *Ascaris*, stimulates a general immunity which is shared by the intestinal mucosa. Mucosal burrowing may not be highly effective in producing a local reaction interfering with nutrition, since the burrowing larvae are demonstrably not dependent upon living tissues for sustenance, but an immunity similar to the general immunity to migrating parenteral larvae may be developed, though more rapidly, due to the localization of the parasites. The type of immune reaction to adult intestinal worms is largely influenced by their feeding habits. Those like *Nippostrongylus* and *Strongyloides* which feed on mucosal tissue stimulate a local immunity directed against their nutrition. Those which feed on blood are not susceptible to this type of local reaction, and are affected only by a general immunity either resulting from repeated parenteral migration of the larvae, or gradually built up by the slow absorption of antigenic material picked up by tapped blood or lymph vessels. Those which feed on intestinal contents would presumably stimulate no immune reaction whatever ; the readiness with which resistance is acquired to such worms as *Ascaridia* and *Heterakis* suggests some dependence on host tissue throughout the lives of the worms.

" 8. In *Trichinella* infections there are also two phases of immunity, intestinal and parenteral. The intestinal phase develops first, is local,

and confers a high degree of protection. The parenteral phase develops later, is general, is manifested by eosinophilia and precipitins, can be duplicated by vaccination, and has a relatively feeble protective action. The local functional immunity may be quite independent of the general serological reaction."

VAN DEN BERGHE (Louis). La schistosomose humaine dans la province de Stanleyville (Congo belge). [**Schistosomiasis in Man in the Stanleyville Province.**]—*Ann. Soc. Belge de Méd. Trop.* 1939. Dec. 31. Vol. 19. No. 4. pp. 573–594. With 2 figs. & 4 plates. [14 refs.]

The investigation covers journeys radiating from 6 centres in the Province of Stanleyville and considers also schistosome infection in the adjacent regions of Kenya, Uganda and the Anglo-Egyptian Sudan.

1. *Stanleyville*: The author is unconvinced of the validity of *S. intercalatum* seeing that variations in the shape and size of the eggs barely exceed those well known for *S. haematobium*. Its local geographical distribution and its limit to the intestine seem to the author to justify its being placed in a subspecies.

2. *Buta*: Hospital figures put the infection rate at 9 per cent. with *S. mansoni* and *S. haematobium intercalatum*.

3. *Niangara*: Hospital figures put the rate at 5 per cent., all with *S. mansoni*; while in 58 children 5 (9 per cent.) were infected. In the river Mangeka, an apparently favourable site for the mollusc hosts, long repeated investigations revealed only seven *Planorbis adowensis* and from only one of them did schistosome cercariae emerge. From Niangara as centre one of his journeys took him to Doruma where WALKIERS discovered *S. faradjei* [this *Bulletin*, 1928, Vol. 25, p. 945]. Of this van den Berghe writes that he found fixed on the wall of the dispensary there a water colour drawing by Walkiers, where the eggs of *S. haematobium*, *S. mansoni* and *S. faradjei* are represented as being of the same size and with no scale reproduced, from which he deduced that all indeed were of the same size. Beneath that of *S. faradjei* Walkiers had written "oeuf sans éperon, miracidium très vif et foncé" [egg without spine, miracidium very active and dark], on which is made the comment that activity and coloration are characters without value here, that many hundreds of examinations made in the region over ten years had shown no more eggs of this sort, and that the appearance must have been due to the spine having lain above or beneath typical *S. mansoni* eggs. In a region south of Niangara, densely forested, 50 children, though showing 73 per cent. of Ascaris and 81 per cent. of hookworm, showed no schistosomiasis, nor could snail hosts be found there.

4. *Faradje* is densely populated and heavily infected with *S. mansoni* with, as photographs show, hepatic cirrhosis and a state recalling that of infection with *S. japonicum*. Of 402 persons examined in one village the percentage of cirrhosis was 8 in men, 9 in women, 17 in boys, 12 in girls, children under 4 years old not being examined; yet no Planorbis was found, other snails were few and none of them emitted schistosome cercariae on dissection.

5. At *Djugu* itself (it lies at a height of 1,800 metres), there is no indigenous case of infection. On the western bank of Lake Albert at a height of 620 metres the infection is heavy, at Mahagi all children examined had the eggs of *S. mansoni* in their stools, visceral infection

with ascites was common, and a European became infected after bathing in the lake there on one occasion only.

6. At *Irumu*, 900 metres, infection with *S. mansoni* is widespread and grave, and many have intestinal infections with *S. haematobium* "var. *intercalatum*." Planorbis is abundant near here and between 40 and 50 per cent. at Buta emitted cercariae. Of 50 Pygmies of Efe race, 11 per cent. were infected with *S. mansoni*, and a long search discovered one *Planorbis adowensis* which was found infected with the cercaria of *S. mansoni*. Infection in the adjacent Kenya, Uganda and Anglo-Egyptian Sudan is touched on. *C. L.*

i. Alcay (L.), Marill (F. G.), Musso (J. C.) & Castryck (R.). Première enquête sur le foyer de bilharziose vésicale de Saint-Aimé-de-la-Djidiouia (Oran). [**First Inquiry into a Focus of Vesical Bilharziasis in Saint-Aimé-de-la-Djidiouia.**]—*Arch. Inst. Pasteur d'Algérie*. 1939. Sept. Vol. 17. No. 3. pp. 421–428. With 3 figs. on 2 plates.

ii. Marill (F.), Alcay (L.) & Musso (J.). Un cas algérien de bilharziose intestinale autochtone. [**An Autochthonous Case of Intestinal Bilharzial Infection in Algeria.**]—*Bull. Soc. Path. Exot.* 1939. Oct. 11. Vol. 32. No. 8. pp. 822–823.

i. A further note on the discovery reported [this *Bulletin*, 1940, Vol. 37, p. 150] of infection by *S. haematobium* in Saint-Aimé-de-la-Djidiouia.

ii. At this place 1 of 15 faecal examinations disclosed eggs of *S. mansoni*. *C. L.*

Mozley (Alan). **The Fresh-Water Mollusca of the Tanganyika Territory and Zanzibar Protectorate, and their Relation to Human Schistosomiasis.**—*Trans. Roy. Soc. Edinburgh.* 1938–1939. Vol. 59. Pt. 3. No. 26. pp. 687–744. With 10 figs. & 3 plates. [21 refs.]

The work reported was carried out in 1937/38 and the author of this monograph considers the East African mollusca in relation to human schistosomiasis, giving a systematic account of the molluscan fauna, their distribution as affected, generally and locally, by earth structure, climate, vegetation, soils, flood, drought, geomorphology, light, food, chemical conditions and temperature, and the means of their control. The results of local surveys are stated.

S. haematobium is found throughout the area, *S. mansoni* is found widely on the mainland but is not native to Zanzibar and Pemba, and from 10 to 70 per cent. of the population harbour these flukes. The local intermediary of the latter is *Biomphalaria pfeifferi* and of the former probably *Physopsis globosa*, though 24 other species of fresh-water molluscs are known to occur. As a result of the varying conditions, above noted, that govern snail distribution, that of the undesirable snails is limited to a few only of the many ponds, marshes, lakes and streams, and these molluscs could be exterminated in many places at small cost by draining, flushing, poisoning and vegetation. As to the last, *Ph. globosa* is abundant where there is abundant growth of aquatic and semi-aquatic plants, but if the service of the water is completely covered by plant leaves these snails are few, and the best plant to effect this seems to be *Pistia stratiotes*. [It is the plant that furnishes air for the larvae and pupae of *Mansonioides* species, the

intermediate hosts of *Filaria malayi* at the other side of the Indian Ocean.] Poisoning by chemical treatment, to avoid native antagonism, would have to be by some local plant. Two of the forms included under the name *Psiadia arabica* were effective in this; so was cold infusion of *Synadenium carinatum*, of a *Euphorbia* species, and of the fleshy part of the fruit of *Sapindus saponaria*; this matter should be pursued as should the effects on local water of ducks and fish. By the use of poisoning, drainage and flushing, directed as is advised specifically for each locality, it is held probable that schistosomiasis would disappear from Zanzibar Island in five years or less, while in Pemba and Tanganyika Territory there should be a great reduction in infection in a rather longer time; and eventually the whole of this part of East Africa can be freed of the parasites. *C. L.*

Scott (J. Allen). **Schistosomiasis in Irrigated Mountain Valleys of Venezuela.**—*Amer. Jl. Hyg.* 1940. Jan. Vol. 31. No. 1. Sect. D. pp. 1–15. With 1 graph & 6 plates. [21 refs.]

This investigation carried out in 1938 has not concerned itself with the pathology or clinical aspect of Mansonian schistosomiasis, but is an attempt to get detailed information on the epidemiology of the infection in a typical endemic area, in the hope that the data may give a basis for wide control in the State.

With practically no rain from November to March crops, largely sugar cane, depend on irrigation, whose leading canals may be many kilometres long. The infecting snails are *Australorbis glabratus* and *A. olivaceus* if this latter is a separate species, they are not found in the rivers and natural streams, except where irrigation canals overflow into them, nor in the first mile or so of a main irrigation canal where the current is brisk, though they can cling to the banks in such conditions. The first snails are usually found where the current is slowed down under a road, or the canal wall has eroded at a curve and the canal has widened.

In the lower valleys the percentages of infection were for males about 80 and for females about 60, in the upper ones about half that. In Cementerio a suburb of Caracas the percentage of infection is 57 in both sexes presumably by elimination of an occupational factor in the town. But for adult males the percentage of infection remained close to 90 from the ages of 10 to 60. Snails were found infected in 10 to 75 per cent. in different localities and the evidence is that infection got in fields is as or nearly as important as that got near dwellings. It is believed that in Venezuela this schistosomiasis is as severe as anywhere in the world. Its control is dealt with thus:—

"Snail breeding should be partially eliminated by the rebuilding and maintenance of drains, and by the careful maintenance and operation of such canals as need to carry water only during actual irrigation of particular groups of fields. Canals which must contain water most of the time could be used more intermittently if other sources of domestic water were provided, and after reconstruction of critical spots by standard methods of malaria control engineering, occasional but complete draining could be effected. In many places where these measures could not be applied or where they prove to be only partially successful, the water could be protected from pollution by adequate rural sanitation, and very frequently the canals could be put underground in critical places, both to protect them from pollution and to prevent people from entering the water. The main difficulties in the application of this scheme would seem to be of an administrative character. The goodwill of the people would have to be

maintained . . . . When it is considered that over half of these people are also infected with hookworm, three-quarters with ascaris, and 90 per cent. with trichuris, any step in the right direction cannot fail to be of benefit." *C. L.*

Giovannola (Arnaldo). Ospiti intermedi dello *Schistosoma mansoni* in Africa Orientale Italiana. [**Intermediate Hosts of** *S. mansoni* **in Italian East Africa.**]—*Rendiconti Istituto di Sanità Pubblica.* Rome. 1939. Vol. 2. Pt. 3. pp. 791–796. With 3 figs.

It is held that the larval host of *S. mansoni* in Eritrea is *Planorbis rupellii* Dunker, 1848 and in Harar is *P. adowensis* Bourguignat, 1879. In the latter case the snails were submitted to attacks by the miracidia and a month later, cercariae identified as those of *S. mansoni*, emerged. The snails are described and figured. *C. L.*

Barlow (Claude H.). **Seasonal Incidence of Infestation of the Snail Hosts with Larval Human Schistosomes.**—*Amer. Jl. Hyg.* 1939. Nov. Vol. 30. No. 3. Sect. D. pp. 73–81. With 1 map & 3 graphs.

"1. An examination of 11,730 *Planorbis boissyi* and 6,132 *Bulinus truncatus* in 1935 and 1936, at El Marg, Egypt, showed that there was a seasonal fluctuation in the infestation rate of these snails, with diminished infection during the winter. This is due to three factors: the Nile flood, a cold season from December to March, and the winter closure of water by the Irrigation Department.

"2. Infestation percentages were demonstrated to reach their peak from July to October, inclusive, all these months being hot.

"3. The temperature curve for the months which were studied approximates closely the curves of infestation rates for both *P. boissyi* and *B. truncatus*.

"4. Schistosome control measures may be improved by gaining a knowledge of the seasons when snails are most easily infected (by miracidia) and when men may most safely work in water in an attack upon the snail hosts."

Pallary (P.). Prospection des eaux magnésiennes de l'oued Rirh (sud constantinois) au point de vue de l'existence des bullins et des planorbes. [**Survey of Magnesium-containing Waters in the Rirh Waddy for Bulinus and Planorbis Snails.**]—*Arch. Inst. Pasteur d'Algérie.* 1939. Dec. Vol. 17. No. 4. pp. 604–612. With 2 maps & 12 figs. on 6 plates.

A survey of various collections of water ranging from Biskra southwards has shown neither Bulinus nor Planorbis; their absence being attributed to excess of soluble salts in the water, particularly to those of magnesium. Analyses made at the Pasteur Institute of Algeria showed that, expressed as MgO, the weight of this salt in milligrams to the litre varied from 199 to 3,460, while that of sodium chloride lay between 280 and 73,660. *C. L.*

Mainzer (F.). **On a Latent Pulmonary Disease revealed by X-Ray in Intestinal Bilharziasis** (*Schistosoma mansoni*).—*Puerto Rico Jl. Public Health & Trop. Med.* 1939. Sept. Vol. 15. No. 1. pp. 111–123. With 7 figs. [10 refs.] [Spanish version pp. 124–135.]

Serial radiographs from the Jewish Hospital, Alexandria, show that in infection with *Schistosoma mansoni* latent pulmonary involvement

is usually present even in cases with no clinical pulmonary symptoms whatsoever, and that it becomes apparent about three months after infection.

The findings fall in, then, with those reported in *S. haematobium* [this *Bulletin*, 1937, Vol. 34, p. 394]. The examinations were made on five Egyptian agricultural labourers.

"We can differentiate between three main types of changes which, however, may be combined with one another :

"a. Focus formation (the size of a millet seed to that of a bean).

"b. Increase in number and density of the normal lung striations, mostly found in the beginning and when the pulmonary process is disappearing.

"c. Enlargement and intensification of the hilar shadow.

"Particularly characteristic are the following types :—

"1. Miliary pulmonary bilharziasis.

"2. Net or honeycomb design of the lungs.

"3. Birch-broom lungs.

"Antimony therapy appears to be without any influence upon the course of the fever of the secondary stage and upon the development of the pulmonary changes, in any case if the therapy is started at the onset of the secondary stage and if we use doses such as those effective in the treatment of the chronic tertian stage." [See also this *Bulletin*, 1938, Vol. 35, p. 665.]

C.L.

Bayoumi (M. L.). **Bilharzial Myelitis.**—*Jl. Egyptian Med. Assoc.* 1939. Aug. Vol. 22. No. 8. pp. 457–461. With 2 figs.

"A case of bilharzial myelitis has been described. It is the only case in which bilharzia ova have been definitely recognised (either in scrapings or in histological sections) in other parts of the body, namely bladder, ureters and seminal vesicles."

After a consideration of literature, a patient is considered who died a month after admission to the Kasr el Aini hospital with symptoms of a transverse lesion of the spinal cord. His urine contained no blood or ova, and the cerebrospinal fluid was clear without excess of cells. Examinations of the stools or rectum are not reported. Autopsy showed a fusiform swelling at the lower end of the spinal cord with calcified bilharzia ova in it and in the nerve roots. There were sandy patches in the trigone of the bladder and along the whole length of both ureters and scrapings from these and from thickened and scarred seminal vesicles disclosed bilharzial ova. [The report by Hoff and Shaby (this *Bulletin*, 1940, Vol. 37, p. 147) bears comparison.]

C. L.

Panayotatou (Angélique). Sur deux nouveaux cas de "bilharziose vesicale," (Schistosoma haematobium) guéris par l' "Antimoniothiomalate de Lithium" à Alexandrie d'Égypte 1937. [**Two Cases of Vesical Schistosomiasis treated by Anthiomaline.**]—*C. R. Soc. Méd. et Hyg. Trop. d'Egypte.* 1937–1938. Vol. 9. pp. 111–114.

Two cases of urinary infection with Schistosoma were cured in 1937 with anthiomaline. One patient, a boy of about 9, had 20 cc. in all of the drug. The other, a girl of 11 had 30 cc. and was then "sterile" as far as eggs go ; the date of the meeting to which the report was communicated bears a date 9 days after the last injection.

C. L.

Alcay (L.), Marill (F.) & Musso (J.). Les réactions de floculation au cours de la bilharziose humaine. (Note préliminaire.) [**Flocculation Tests in Human Schistosomiasis.**]—*Bull. Soc. Path. Exot.* 1939. Oct. 11. Vol. 32. No. 8. pp. 836–842.

This paper is noticed here by title only since it is a preliminary note and the authors state that definite conclusions cannot yet be drawn, and propose to publish the results of further work. It would be helpful if they would give the details of the tests used instead of the names of those who devised them since it is difficult to trace the modifications constantly being introduced by the workers referred to. For instance Gaté's test appears to be a formol-gel test, but the details may not be familiar to all British readers. *C. W.*

Mainzer (F.) & Krause (M.). **Changes of the Electro-cardiogram appearing during Antimony Treatment.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1940. Jan. 29. Vol. 33. No. 4. pp. 405–418. With 5 figs. [15 refs.]

"In twelve bilharzia patients the development of the electro-cardiogram was followed up during a course of tartar emetic treatment.

"In seven cases considerable alterations were found, changes of the S-T interval as well as of the T deflection. The tracings which had in all the cases been absolutely normal assumed a markedly pathological character in three cases. In the other four cases the picture suggested the suspicion of a disturbed heart action. In three persons the electrocardiogram remained unchanged, in two further cases the changes were insignificant.

"The extent of the electrocardiographic changes was parallel to the degree of chronic bradycardia due to the effect of antimony. In contradiction to the view held hitherto the persistent antimony bradycardia differs in its electrocardiographic characteristics from the slowing of the pulse rate due to vagal stimulus. In two patients in whom the electrocardiogram was considerably changed no bradycardia occurred.

"The electrocardiographic abnormalities as well as the bradycardia are, therefore, considered as resulting from intoxication of the heart muscle through therapeutic antimony administration, though the process in most cases is not clinically evident. In exceptional cases the condition may result in sudden death, through auricular fibrillation."

Bonne (C.) & Sandground (J. H.). Bilharzia japonicum aan het Lindoemeer. [*S. japonicum* **Infection round Lake Lindoe, Celebes.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1940. Feb. 20. Vol. 80. No. 8. pp. 477–481.

"Eggs of bilharzia japonicum were demonstrated by a technique of concentration in 93 out of 176 inhabitants of the villages on the shore of Lake Lindoe in Central Celebes, belonging to a very primitive tribe of Toradjas. Dysenteric symptoms caused by bilharzia were absent. Only one stool with blood and mucus was seen, which was obviously due to amoebiasis.

"Many huge spleens reaching in certain cases beyond the umbilicus were observed. It remains uncertain whether they were the result of the bilharzial infection or due to malaria, which was also present.

"No naturally infected snails were discovered, and experimental infections could not be obtained by exposing various snails to the miracidia escaping from the schistosome-eggs in the stools.

"A list of snails from the shores of Lake Lindoe identified by Bequaert is added. Only a few specimens of No. 12, a snail related to Blanfordia nosophora (Robson) were present in our collections."

BARTSCH (Paul). **A New Intermediate Host of the Asiatic Blood Fluke *Schistosoma japonicum* Katsurata.**—*Chinese Med. Jl.* 1939. Aug. Vol. 56. No. 2. pp. 171–172.

The snail was sent to the U.S. National Museum by Y. T. YAO for identification, where it was named *Oncomelania yaoi* n. sp. It was collected at Wang Ling Hsiang, Pingyang Hsien in the central part of Kiangsi Province, China. The find extends the known range of the genus considerably further south. The evidence that it is an intermediate host of *S. japonicum* is not recorded. *C. L.*

KATO (Tatsuo). **Method of collecting Cercariae of Schistosomum Japonicum and Report of Experiment in Inoculation.**—*Kitasato Arch. Experim. Med.* 1939. Nov. Vol. 16. No. 4. pp. 340–342. With 2 figs. on 1 plate.

Washed Blanfordia snails are set under water in the light, but not in direct sunlight at a temperature of over 15°C. When cercariae emerge and attach themselves to the surface film this is looped off and the cercariae transferred to a slide or watch glass. The loop used was of horsehair or palm leaf bark fibre. When 30 cercariae were transferred to shaved rabbits' skin the number of adults that developed varied from 1 to 9. *C. L.*

WISCONSIN, STATE OF: COMMITTEE ON WATER POLLUTION. 1939. July.—**Progress Report on the Chemical Treatment of Lakes and Streams with Special Reference to the Origin and Control of Swimmers Itch.** [Summary taken from *Public Health Engineering Abstracts.* Washington. 1940. Jan. Vol. 20. No. 1. p. 19. Signed L. F. WARRICK]

In order to give attention to control of algae and other aquatic growths responsible for nuisances and occurrences of swimmers itch, an inter-departmental Committee on Chemical Treatment of Lakes and Streams of the State Committee on Water Pollution of Wisconsin was established to study problems involved and develop a suitable control program for the State to take care of all interests involved. The objective of the work carried out during 1938 and 1939 has been to suppress by chemical treatment those algae growths responsible for odor nuisances, tastes in water supplies from surface sources, interference with certain manufacturing processes, and troubles encountered in some recreational areas, especially where schistosome dermatitis (swimmers itch) has been experienced. The progress report outlines problems involved, reviews legal provisions, summarizes the results of studies to determine the effect of various chemicals on fish life, and describes results obtained in demonstrations of treatment methods that have been conducted under the direction of the committee. The use of copper carbonate for eliminating snails harbouring cercariae from recreational bathing areas is advocated. Methods for applying the chemicals are described. Further studies are advocated to place the treatment on a more scientific basis, and appended is the form of permit and report on treatment used by the committee in providing general State supervision over chemical treatment of lakes and streams. [See also this *Bulletin*, 1940, Vol. 37, p. 149.]

Hsü (H. F.). **Studies on the Food and the Digestive System of Certain Parasites. V. On the Food of Liver Flukes.**—*Chinese Med. Jl.* 1939. Aug. Vol. 56. No. 2. pp. 122–130. With 2 figs. on 1 plate. [15 refs.]

The method of study was by serial sections of *F. hepatica*, *D. dendriticum*, *C. sinensis* and *Metorchis orientalis* taken from the bodies of animals. The material found in the intestine is taken to be their food.

"*Fasciola hepatica*, takes an enormous amount of blood cells: *Clonorchis sinensis*, mainly epithelial cells and inflammatory products; *Metorchis orientalis*, more blood cells than epithelial cells; and *Dicrocoelium dendriticum*, inflammatory products, epithelial cells and red blood cells. The last mentioned species shows, furthermore, an extra-intestinal digestion in the mouth cavity of its oral sucker."

[It will not be assumed that undigested residue is the part of its food which nourished a parasite. The digested part, that on which it lives, presumably exceeds the residue in bulk. Where there is so much cellular matter there must also have been plasma and lymph.]

C. L.

Galliard (Henri). Recherches sur l'étiologie de la distomatose hépatique au Tonkin. [**On the Aetiology in Tonking of Infection by** *Clonorchis sinensis*.]—*Ann. de l'Ecole Supérieure de Méd. et de Pharm. Indochine.* 1938. Vol. 2. pp. 96–103. With 3 figs. on 3 plates. [15 refs.]

Investigations on infection with *Clonorchis sinensis* dealing with the distribution of the molluscan hosts in Tonking and in part of Annam. The species concerned are, in the Delta, *Bithynia chaperi*, which is very common, *B. longicornis*, far rarer, and *Melania tuberculata*; in the high country *M. variabilis*; and in all parts *Vivipara polyzonata* and *V. quadrata*. By its very numbers and its general receptivity of trematode infection *B. chaperi*, of which 4 of 600 were found infected, is the most important mollusc host in the Delta and its absence from the higher regions explains their freedom. Infection was found in 1 of 250 *M. tuberculata* examined. Metacercariae have been found in *Culter brevicauda*, and in places infection presumably occurs in *Carassius auratus*, the classic host, and in *Anabis scandens*. Apart from the distribution of snail hosts, the habit of eating raw fish is an important factor in spreading infection, for it is common in Tonking but rare in North Annam where *B. chaperi* abounds. *C. L.*

Miyanaga (Sukio). **Studies on Second Intermediate Host of** *Clonorchis sinensis* **in Mukden Area.**—*Jl. Oriental Med.* 1939. Sept. Vol. 31. No. 3. [In Japanese pp. 565–568. With 3 figs. on 2 plates. English summary p. 43.]

Of 15 species of fish examined in the Mukden area of Manchukuo, 6 were found to contain cysts of *C. sinensis*. The numbers of fish, the number of grams of muscle and the average number of cysts per 100 grams were:—*Carassius auratus* 114, 1,226, 1·7; *Hemiculter clupeoides* 49, 51, 6; *Leucogobio herzensteini* 298, 133, 188; *Pseudogobio rivularis* 15, 27, 3·3; *Pseudorasbora parva* 240, 205, 134; *Rhodeus notatus* 7, 2, 125. *C. L.*

KATO (Konroku). Experimentelle Untersuchungen ueber die therapeutische Wirksamkeit von zwei neuen Antimonpräparaten auf die Kaninchenclonorchiasis im Vergleich mit der des Stibnals und Brechweinsieins. [**Observations on Two New Antimony Preparations on Clonorchis Infection of Rabbits compared with that of Stibnal and Tartar Emetic.**]—*Okayama-Igakkai-Zasshi* (*Mitt. d. Med. Gesellsch. z. Okayama*). 1940. Jan. Vol. 52. No. 1. [In Japanese pp. 51–64. With 5 figs. [22 refs.] German summary pp. 64–65.]

The two new preparations were fouadin and Sizze A ; their action in reducing eggs and retarding development of young flukes was better than that of the older preparations. *C. L.*

KINUGASA (Masaru). **Investigations on the Incidence of Lung Fluke Disease** (*Paragonimus westermanii*) **in Sintiku Prefecture. II. On its Incidence in the Population in Sintiku Prefecture.**—*Taiwan Igakkai Zassi* (*Jl. Med. Assoc. Formosa*). 1939. Oct. Vol. 38. No. 10. [In Japanese pp. 1445–1450. English summary pp. 1450–1451.]

Of 5,150 persons examined, 232, or 4·5 per cent., were found infected, the percentage varying from 0·33 in Sintiku city to 8·09 in Dainampo in Tiku-nan District. The rate has fallen compared with that got by MATUO and YOKOGAWA 20 years ago. The author associates high rates with probable consumption of crabs, raw or salted. For that procedure are held responsible the higher rates in the Takasago and Cantonese than in the Fukienese, in males who take salted crabs to get up a thirst for a drink than in females, and in Buddhist monks who class crabs neither as fish nor animal and so as eatable by them.

C. L.

RO (Mantoku). **On the Size and Form of Normal Eggs of the Lung Fluke** (*Paragonimus westermanii*).—*Acta Japonica Med. Trop.* Formosa. 1939. Dec. Vol. 1. No. 2. pp. 203–208. With 20 figs. on 2 plates.

BONNE (C.). Eenige verdere waarnemingen over echinostomiasis. [**Further Observations on Echinostomiasis.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1940. Feb. 27. Vol. 80. No. 9. pp. 537–548. English summary.

" I. Reports on 6 autopsies of natives in whom Echinostoma ilocanum was incidentally discovered. All of them were patients of the same agricultural colony for insane males. The worms are present in the jejunum, sometimes in large numbers (maximum 190). The cause of death was quite independent from the echinostomiasis.

" Report on one autopsy of an old Javanese woman who had never been insane and proved to be a carrier of echinostomes. This was the first case discovered on Java without any connection with the above mentioned colony.

" II. The first intermediate hosts in Celebes (Lake Lindoe) are two planorbid snails Anisus sarasinorum Bollinger and Anisus convexiusculus Hutton.

" In Celebes the snail Viviparus javanicus rudipellis P. & F. Sarasin acts as second intermediate host but the most important carriers of metacercariae with regard to human echinostomiasis in Celebes are two

species of mussels: Corbicula linduensis Bollinger and Corbicula subplanata v. Martens. All the identifications of molluscs are by Bequaert.

"III. In Java similar infected molluscs can be found. A number of Corbicula species live in streams and ponds but never in such enormous quantities as in Lake Lindoe in Celebes. They are occasionally consumed in boiled condition by the native population. Infestation with echinostome-metacercariae is very common in certain species and uncommon or absent in others. Further detailed studies on this subject are necessary. The snails in the ricefields of Western Java (Pila, Viviparus, Lymnaea, Anisus) are practically 100 per cent. infected in certain localities, as described already by Sandground. The adult echinostomes developing from the mussel metacercariae in Java are undistinguishable from these developed from snail-metacercariae in Java.

"IV. In man the main symptoms of the Celebes-type of echinostomiasis are diarrhoea and slight pains in the bowels. In experimental human infections the diarrhoea disappeared a few weeks after the infection became established. Eosinophilia rose to 38 per cent. 5 weeks after the infection but came down to normal a few weeks later; in the meantime a large part of the worms present had been expelled. Human infections are not transient, worms being still present and producing eggs 7 months after the experimental infection.

"V. Bonne and Sandground mentioned a winged-tail cercaria from Anisus sarasinorum in Lake Lindoe in Celebes, which they accepted as the cercaria of the Lindoe echinostomiasis in man. No direct proof was possible. Sandground describes shedding of echinostome cercariae in naturally infected Anisus convexiusculus in Java. They were cercariae with unwinged tails. No winged-tail cercariae have been observed in naturally infected Anisus convexiusculus in Java. Experimental exposure of Anisus convexiusculus to miracidia of Celebes echinostomes resulted in a single instance in production of redia containing winged-tail cercariae, which strengthens the probability that the winged-tail cercariae in Anisus sarasinorum from Lake Lindoe really represented a developmental stage of the human echinostome from that region. Further confirmation seems desirable."

Bonne (C.) & Sandground (J. H.). Echinostomiasis in Celebes veroorzaakt door het eten van zoetwatermosselen. [**Echinostome Infection in Celebes as a Result of eating Mussels.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1939. Aug. 22. Vol. 79. No. 34. pp. 2116–2134 [3016–3034 *sic*]. With 14 figs. on 4 plates. English summary.

A further investigation on the echinostome infection reported by Brug and Tesch [this *Bulletin*, 1938, Vol. 35, p. 218] about Lake Lindoe in Celebes.

The writers spent 11 days by this lake in studying the local bilharzial and echinostome infections and report on the latter. They examined the available stools of the populations of three villages and found respective percentages of infection of 96, 44 and 24. The infections were heavy as shown by tetrachlorethylene treatment, for as many as 260 flukes were brought away in the first of the subsequent stools. It is thought that the worm, though near *E. malayanum* Leiper, 1911, may perhaps be a new species. "By a process of exclusion, the observation of circarien development, as well as by other evidence it is held that a small planorbid snail (not yet identified) serves as the primary molluscan host." "*All* mussels taken from the lake close to the heavily infected village have been found carrying large numbers of echinostome metacercariae. These mussels appear prominently in

the daily diet of the local population. They are eaten after passing through a primitive boiling process," and on being administered to laboratory bred rats and mice and eaten by the two authors have produced echinostomes of the kind occurring in man locally. " Reservoir hosts " could not be found. *C. L.*

Vazquez-Colet (Ana) & Africa (Candido M.). **Determination of the Piscine Intermediate Hosts of Philippine Heterophyid Trematodes by Feeding Experiments. Progress Report.**—*Philippine Jl. Sci.* 1939. Oct. Vol. 70. No. 2. pp. 201–215. With 4 plates. [20 refs.]

MALARIA.

Précis of Abstracts in this Section.

Lepşi (p. 494) gives an account of malaria and mosquitoes in Bessarabia.

Farinaud and Prost (p. 494), writing of the hyperendemic conditions in the valleys of part of Cambodia, in which *A. minimus* is ubiquitous, and in which the population is declining largely owing to malaria, advocate removal of the people to the higher ground where water is less abundant. Malnutrition due to primitive agriculture and to soil erosion is now universal. In the meantime drug treatment of children appears to be beneficial. Gunasekara (p. 495) reports that low parasite rates were found in a survey of Ceylon, even in hyperendemic parts of the Island, but especially in the wet zones. *P. malariae* showed the highest prevalence. Earle (p. 495) reports on the epidemiological features of malaria in Porto Rico, which is not a hyperendemic area. The maximum spleen rates are in the 10 to 20 age group, but all ages suffer from a considerable amount of illness and local epidemics are common. Cros (p. 496) describes the extent of malaria infection in the cantons of part of Madagascar. Fratani (p. 496) describes the high prevalence of malaria due to excessive rainfall in part of Oran in 1937.

Sinton (p. 497) quotes evidence which indicates that sporozoites of *P. ovale* have a greater power of developing and multiplying in the human body than have inoculated trophozoites of the same species.

Bertram and Gordon (p. 497) report on an insectarium with constant temperature and humidity control, and on the rearing of *A. maculipennis atroparvus*. Gebert (p. 498) describes a simple apparatus for maintaining mosquitoes alive under conditions of adequate humidity in dry tropical conditions. Boyd (p. 498) reports that the maintenance of *A. quadrimaculatus* for 7 years in the laboratory has not altered its susceptibility to *P. vivax*.

Pinto (p. 498) traces the history of the introduction of *A. gambiae* into Brazil from W. Africa and of the resulting pandemic of malaria which occurred in 1938. The importance of ships and aeroplanes in the spread of this mosquito is referred to, and the conditions which favour breeding are briefly mentioned. Le Gaonach (p. 500) shows that *A. sergenti* is found as far as the central Sahara. The only anopheline found infected in an area near Calcutta by Roy (p. 500) was *A. varuna*.

Afridi *et al.* (p. 500) show that in three villages near Delhi the percentage of anophelines containing human blood varies inversely with the proportion of cattle to human population.

Try (p. 501) gives results with the Wassermann and Vernes tests in malaria, which lead him to the conclusion that in malaria endemic areas syphilis can only be diagnosed after repeated tests by more than one method. In discussion, however, Massias states that no infection other than syphilis can give a positive Wassermann. Matsunobu (p. 502) shows that the haemopoietic function is increased during the febrile period of malaria, sinks to normal in the afebrile interval and increases again during convalescence.

Fondé and Fondé (p. 502) describe the reactive and the non-reactive forms of chronic malaria, in the latter of which the defensive powers are exhausted. The manifestations may simulate almost any disease. Prolonged treatment is necessary and in the non-reactive cases specific drugs should be used with caution and general treatment employed, but this cannot be standardized.

Chopra *et al.* (p. 503) found that M. & B. 693, 4 gm. daily for 5 days, controlled the symptoms in a few cases of *P. vivax* and *P. falciparum* malaria and caused the disappearance of parasites.

Manca (p. 503) reports favourably on manganese iodo-mercurate in the treatment and prophylaxis of malaria, giving figures of those treated and the controls. Chopra and Basu (p. 505) however report disappointing results with this drug in prophylaxis.

Faiguenbaum (p. 504) reports favourably on the Ascoli treatment in 126 cases of chronic and 9 of recent malaria. Diamanti (p. 504) reports on a few patients treated by this method.

Russell and Knipe (p. 504) state that weekly spraying of houses reduces the transmission of malaria to a marked extent, but the cost is relatively high for the villages concerned.

Banerjea (p. 505) shows that the periodical flushing of drains due to the rapid fluctuations in the level of the water in the Gumti weir, Lucknow, sweeps away the anopheline larvae.

Danilova and Buduimko (p. 505) refer to the antilarval properties of acidol, a product of petroleum distillation, which is highly toxic if the temperature of the water is above 17°C., which is necessary for film formation.

In *Public Works* (p. 505) is an account of a Paris green of a maximum particle size of 2μ which floats longer than the usual preparation and may even float just below the surface of water. It is more efficient and economical than regular Paris green. Serguiev *et al.* (p. 506) describe the mechanism and efficiency of a motor pulverizer for spreading a Paris green and kaolin dust. Russell and Jacob (p. 506) report on the prevention of mosquito breeding in casuarina pits; Paris green is successful against Anopheles, but not Culex, if applied every 6 days or less; Gambusia is effective, but naturalistic methods fail.

Malaria of birds and monkeys.—Causey (p. 507) found that injection of the blood of a duck infected with *P. cathemerium* into splenectomized and non-splenectomized canaries produced infection only in the former, but that the blood of an infected canary produced infection in both. He regards this as due to the action of the spleen in removing foreign red blood cells rather than to a destructive action on the parasites. Hegner and Dobler (p. 508) show that passive immunity of a low

order may be transmitted by the injection of serum or spleen emulsion of canaries infected with *P. cathemerium*.

HERMAN and GOLDFARB (p. 508) show that splenectomy has no influence on the degree of infection produced in chicks by *P. circumflexum*. MANWELL and GOLDSTEIN (p. 508) discuss the immunity, produced by different strains of *P. circumflexum*, which though more markedly homologous, is frequently reciprocal.

WOLFSON (p. 508) discusses *P. relictum* in canaries and ducks. MANWELL and VOTER (p. 509) describe the characters of *P. nucleophilum*.

FULTON (p. 509) shows that glucose, laevulose, maltose, mannose and especially glycerol are oxidized by *P. knowlesi* in culture, and that the blood sugar and liver glycogen levels of heavily infected animals are low. RODHAIN and LASSMAN (p. 509) show that *P. gonderi*, unlike *P. knowlesi* and *P. cynomolgi*, has a marked tendency to infect reticulocytes. *C. W.*

LEPŞI (I.). Sur quelques moustiques et sur la malaria en Bessarabie. [**Certain Mosquitoes and Malaria in Bessarabia.**]—*Bul. Muz. region. Basarab. Chişinău.* 1938. No. 9. pp. 47–71. [Summarized in *Rev. Applied Entom.* Ser. B. 1940. Jan. Vol. 28. Pt. 1. p. 9.]

"An account is given of further investigations on Anophelines and malaria in Bessarabia, carried out in 1936–38. Observations on other mosquitos are also included. Of the hibernating mosquitos collected in cellars in the town of Chişinău, *Culex pipiens*, L., was again the predominant species, its ratio to *Anopheles maculipennis*, Mg., averaging 240 : 1 for the two years. In all, only 26 examples of *A. maculipennis* were taken and more than one seldom occurred in a cellar. Figures are given showing the numbers of cases of malaria due to *Plasmodium vivax*, *P. falciparum* and *P. malariae* during the years 1932–38. *P. vivax* was predominant, but the numbers due to *P. falciparum* are unusually high for an area where the sole vector is *A. maculipennis*. As 5–8 per cent. of the population of the town still suffer from malaria, the author concludes that its incidence has not decreased, in spite of a certain amount of reclamation work that has been carried out in the swamps of the Bâc.

"Observations in 13 villages in a district bordering on the marshes of the Bâc showed that malaria became less common as the villages were situated further from the marshes, which afford numerous breeding places for *A. maculipennis*. Of the Anophelines taken in houses in a town in the delta of the Danube in July–September 1938, *A. hyrcanus*, Pall., was more numerous than *A. maculipennis*, but neither was abundant. The malaria index for 1924–38 averaged only 1·7 per cent., and almost all the cases were infected by *P. vivax*."

FARINAUD (M. E.) & PROST (P.). Le paludisme chez les Phnongs. Notes de démographie et d'épidémiologie. [**Malaria among the Phnongs : Demography and Epidemiology.**]—*Ann. de Méd. et de Pharm. Colon.* 1939. July–Aug.–Sept. Vol. 37. No. 3. pp. 764–780. With 1 chart.

Upper Chlong, inhabited by the Phnongs, is a part of Cambodia which is conterminous with both Annam and Cochin-China. It covers an area of 14,000 square kilometres and comprises three more or less well defined areas, a plateau 700 to 900 metres high, an intermediate region 500 to 700 metres high, and a low-lying region 100 to 500 metres

high. There is a short dry season, December to March, and a rainy season April to November. In the valleys in which the native villages are situated there is everywhere an abundance of clear running water : *A. minimus* is ubiquitous. The Phnong population of this large area numbers only 9,570—3,386 men, 2,338 women and 3,846 children. The population is steadily decreasing and for this hyperendemic malaria is chiefly responsible. Other communicable diseases are of little importance. All infants are infected with malaria in the first year of life. Infant mortality is terribly high, 30·8 per cent. Malnutrition is universal : insufficient crops dependant upon primitive agriculture in clearings and subsequent soil erosion, coupled with a disinclination or inability for hard manual work, explain the malnutrition. Remedial measures would necessitate the removal of villages from mosquito infested valleys to the plateau. Pregnant women and children need special care. In an experimental group of 9 villages progress has been made in the latter direction : all sick infants and children have been treated with quinine. In 1938 in these villages there were 18 births and only 9 deaths. *Norman White.*

Ceylon : Administration Report of the Director of Medical and Sanitary Services for 1938 [Gunasekara (S. T.)]. [**Malaria** pp. C33–C38.]

During February and March 1938 school-boys from all parts of Ceylon to the number of 144,873 were examined for enlargement of the spleen. Blood films were taken from some ten per cent. of these boys, 14,653 in all, and examined for parasites. A hundred fields of the thin film and twenty fields of the thick smear were examined in each case. The period February–March marks the declining stage of the annual malaria recrudescence over the greater part of the Island. Parasites were found in 664, a parasite rate of 4·5 per cent. as compared with 13·5 in 1921. The distribution of quinine to school-children was stopped one month before the survey. The rates were very low even in hyperendemic parts of the Island. Almost everywhere the quartan parasite was most in evidence, the percentage prevalence of the three species being, *P. malariae* 49·7, *P. falciparum* 34·2 and *P. vivax* 19·1. Mixed infections explain the fact that the sum of these percentages exceeds 100.

With regard to rainfall the Island comprises three well defined zones, wet, intermediate and dry. The parasite rates of these three zones were 0·9, 5·5 and 7·7 per cent. Corresponding spleen rates were 4·9, 26·1 and 36·6. The spleen rate for the whole Island was 21·2 per cent., as compared with 28·3 in 1937 and 30·6 in 1936. *N. W.*

Earle (W. C.). **The Epidemiology of Malaria with Special Reference to Puerto Rico.**—*Puerto Rico Jl. Public Health & Trop. Med.* 1939. Sept. Vol. 15. No. 1. pp. 3–27. With 4 charts. [Spanish version pp. 28–43.]

The author considers that the literature of the epidemiology of malaria is dominated by the views of those working in hyperendemic areas : malaria is also a serious problem in other conditions. For this reason a report on malaria conditions in Porto Rico, where spleen rates over 50 per cent. are extremely rare, is of interest. Long time trends in malaria mortality are noted : rates of from 3 to 4 per thousand are common. Local epidemics are of frequent occurrence : annual attack

rates of 200 per 1,000 population characterize the more malarious parts of the island. About 40 per cent. of clinical malaria cases are caused by *P. vivax*, 56 per cent. by *P. falciparum*, and 4 per cent. by *P. malariae* and mixed infections. *P. vivax* is most in evidence from May to August, *P. falciparum* in December or January. Sickness caused by *P. vivax* is most frequent in the age group 5 to 9 years: *P. falciparum* causes most sickness in the 10 to 14 age group. In late years *P. falciparum* infections predominate. During acute illness *P. vivax* gametocytes are found twice as frequently as are gametocytes of *P. falciparum*. The average parasite counts of patients suffering from clinical malaria were *P. vivax* 1,529, *P. falciparum* 3,651 and *P. malariae* 534 per cmm. of blood. The maximum spleen rate was found in the age groups 10 to 20 years. Considerable illness is caused by malaria in all age groups and no group is a special source of mosquito infection. *N. W.*

Cros (R.). Indice splénique dans la circonscription médicale de Vatomandry (Madagascar). [**Spleen Index in Vatomandry (Madagascar).**]—*Bull. Soc. Path. Exot.* 1939. Oct. 11. Vol. 32. No. 8. pp. 813–816.

During a medical survey whose primary object was to ascertain the extent of leprosy infection in the region of Vatomandry in Madagascar, advantage was taken of the opportunity to take note of the extent of malaria infection among the population as revealed by enlargement of the spleen. The author states that he obtained no evidence of the prevalence of other pathological conditions which cause splenomegaly. In all 8,114 individuals were examined during the latter half of the year, which is less malarious than the first half. Of these 28 per cent. had enlarged spleens. The spleen index of 4,655 children, included in the above total, was 50·75 per cent. There was but little difference between the rates found in the coastal cantons which are flat and marshy, and in the hilly interior cantons, respectively. There was, however, very considerable difference between the rates of different individual cantons in both areas. *N. W.*

Fratani (L.). Etude épidémiologique du paludisme à Beni Abbès (Sahara oranais) en 1937. [**Epidemiological Study of Malaria in Beni Abbès, Oran, Algeria, in 1937.**]—*Arch. Inst. Pasteur d'Algérie.* 1939. Sept. Vol. 17. No. 3. pp. 429–437. With 1 map & 4 figs. on 2 plates.

Malaria in Beni Abbès, an oasis in the Oran Sahara, varies greatly in intensity from year to year, being dependent, for the most part, on the rainfall in the catchment areas of the tributaries of the Saoura *oued*, on the bank of which the oasis is situated. A spate in the autumn of 1936, and another at the end of August 1937, coupled with a condition of undernourishment of the population consequent upon a partial failure of the date crop, were responsible for a high prevalence of malaria in 1937. There are also permanent anopheline breeding places, depressions in the bed of the stream, and some artificial breeding places dependent upon the methods of irrigation employed.

The population numbers about a thousand, for the most part a stable population. In September 1937, 255 children from 0 to 15

were examined ; the spleen index was 41, the parasite index 70·9 per cent. Of the parasites identified 76·1 per cent. were *P. falciparum* and 8·7 per cent. *P. vivax* ; the remainder were undetermined. Four species of Anopheles were found, *A. multicolor, A. hispaniola, A. sergenti* and *A. d'thali* ; the last named is a recent discovery ; it is rare in the southern territory. It breeds in slightly saline water. From the clinical point of view the disease was not very severe. For financial reasons measures have to be confined to small scale antilarval measures and the treatment of the sick. The fry of a local fish, *Barbus figuigensis*, though not as voracious as *Gambusia*, are of use in the control of mosquito larvae. *N. W.*

Sinton (J. A.). **Studies of Infections with *Plasmodium ovale*. III. Resistance to the Inoculation of Sporozoites as compared with Trophozoites.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1939. Nov. 25. Vol. 33. No. 3. pp. 305–318. [29 refs.]

Of 108 primary infections with *P. ovale*, 86 were induced by blood inoculation and 22 by sporozoites. Evidence of resistance to infection, indicated either by the failure or very low intensity of the parasitic infection, or by the mildness of the clinical reaction, was obtained in many cases inoculated with blood. No such evidence was forthcoming in the cases inoculated with sporozoites. The effects of reinoculations, of patients who had acquired some resistance to *P. ovale* as the result of a previous induced infection, with sporozoites and trophozoites respectively were compared. Of 19 reinoculations with trophozoites 15 failed to provoke detectable infections : only 4 of 21 sporozoite reinoculations failed to infect. The greater infective power of sporozoites, as compared with trophozoites, cannot be explained by dosage : the numbers of sporozoites injected were less than the numbers of trophozoites. There was no evidence of the transference of any passive immunity with the blood inoculations. The observations indicate that *P. ovale* sporozoites have a greater power of developing and multiplying in the human body than have inoculated trophozoites of the same species. [See also this *Bulletin*, 1940, Vol. 37, p. 183.]

N. W.

Bertram (D. S.) & Gordon (R. M.). **An Insectarium with Constant Temperature and Humidity Control ; together with a Description of a Simplified Technique for the Rearing of *Anopheles maculipennis* var. *atroparvus*.**—*Ann. Trop. Med. & Parasit.* 1939. Dec. 30. Vol. 33. Nos. 3 & 4. pp. 279–288. With 2 figs. & 3 charts.

In the first part of the paper the authors describe a small room, in the School of Tropical Medicine at Liverpool, in which they maintain nearly constant conditions of temperature and humidity. The room has a volume of about 1,000 cu. ft., and did not prove very expensive to construct. A source of difficulty is the entrance of solar heat through the window. It is possible to maintain a steady high humidity, which is all that is required : no arrangement is made for reducing humidity. The room is used for maintaining stocks of many sorts of biting insects.

The second part of the paper describes a method of maintaining stocks of *Anopheles maculipennis atroparvus* in the insectary. In

essentials Bates's method is used. This entails making a rather thick suspension of soil and adding it to the breeding bowl at frequent intervals. The method appears to be simple and highly successful.

P. A. Buxton.

GEBERT (S.). **A Small Apparatus for the Experimental Infection of Adult Mosquitoes and their Subsequent Breeding.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1939. Nov. 25. Vol. 33. No. 3. pp. 353–356. With 1 fig.

When anophelines are infected with malaria experimentally they must frequently be kept alive for 3 or 4 weeks or longer: this necessitates keeping them in an atmosphere sufficiently humid, a matter which may present some difficulty, more especially in a tropical summer. The author describes a simple piece of apparatus which he has found useful for this purpose. The cork of a 3 by 1 inch specimen tube is bisected transversely. Two V-shaped slots are cut on opposite sides of the lower half: this slotted half is pushed down inside the tube, leaving a space of $\frac{3}{4}$ in. between the cork and the bottom of the tube. When the mosquito is placed in the tube the mouth of the tube is closed with mosquito netting tied round the collar. When the mosquito has fed through the netting the space below the cork is nearly filled with water; this can be done with a capillary pipette. A pledget of cotton wool saturated with water is placed on the netting; this is saturated each afternoon. If the mosquito is to have no more blood meals, a few drops of honey smeared under the piece of cotton wool may provide the necessary food. The cotton wool should not be kept continuously moist. In this apparatus mosquitoes have been kept alive as long as 73 days. *N. W.*

BOYD (Mark F.). **On the Susceptibility of *Anopheles quadrimaculatus* to *Plasmodium vivax* after Prolonged Insectary Cultivation.**—*Amer. Jl. Trop. Med.* 1939. Nov. Vol. 19. No. 6. pp. 593–594.

A laboratory strain of *A. quadrimaculatus* has been maintained for seven years without any introduction of new stock, during which time some 84 generations have been passed in an artificial environment. This environment has produced no change in the mosquito's susceptibility to *P. vivax*. Experiment showed that this susceptibility is very closely similar to that of wild *A. quadrimaculatus* caught in the vicinity of the Research Station. *N. W.*

PINTO (Cesar). Disseminação da malaria pela aviação; biologia do *Anopheles gambiae* e outros anofelineos do Brasil. [**The Spread of Malaria by Aircraft. Biology of *A. gambiae* and other Brazilian Anopheles.**]—*Mem. Inst. Oswaldo Cruz.* 1939. Vol. 34. No. 3. pp. 293–430. With 35 figs. & 63 plates. English summary pp. 342–344.

"1. *Anopheles* (*Myzomyia*) *gambiae* a species peculiar to the African Continent has been introduced into America (State of Rio Grande do Norte, Brazil) between August, 1928 and February, 1930.

"2. The introduction of this *Anopheles* into Brazil (Natal city, near the seashore) must have been realized through ultra-rapid steamers, called *avisos*, which cross the Atlantic from Dakar (Africa) to Natal (Brazil) ***in less than three days.***

" 3. The introduction of *Anopheles gambiae* into that sea-port was made possible by lack of inspection on the part of the Sanitary Department of Ports, which should have been made, before the *avisos* touched at the port of Natal.

" 4. In 1931 there appeared a great malaria-epidemic, transmitted by *A. gambiae*, in the district of Alecrim, situated near the anchor-ground of these *avisos* in the harbour of Natal. This epidemic has not had any parallel as yet in Brazil in view of the great number of sick and fatal cases. This mosquito is undoubtedly the most dangerous to man, since, besides transmitting the human filariasis (*Wuchereria bancrofti*), it infects itself by *Plasmodium* in the proportion of 62 per cent. the highest one ever observed, as shown by Nelson C. Davis (1932) in Natal (Brazil).

" 5. Eight years after the introduction of *Anopheles gambiae* into Brazil, during the summer of 1938, there appeared a malaria-pandemic in the regions of Rio G. do Norte and Ceará, infected by this mosquito, attacking nearly forty thousand persons, and killing more than 20 thousand. During these eight years *Anopheles gambiae* spread out to the Northern part of Brazil, reaching State of Ceará, where it has been found in fifty-five localities.

" 6. From what is known about the geographical distribution of *Anopheles gambiae* in Africa, it is to be feared that this *Anopheles* may spread over all the American Continent, covering not only the hot regions but also the cold ones.

" 7. The localities, situated near the sea-shore, as for instance, Areia Branca, State of Rio G. do Norte, visited by airplanes of Commodoro-type, may contribute to the dissemination of *Anopheles gambiae*, transported by airplanes, if these are not submitted to fumigation through the medium of appropriate insecticides, as is being done in the United States with the airplanes coming from South America.

" 8. The morphological study which I have made in Natal (Brazil), of the whole life-cycle of *Anopheles gambiae*, corresponds to the type-form of this *Anopheles*, referred to by Miss A. M. Evans (1938), which is entirely independent of the variety *melas*, which develops itself in water of high salinity, as has been very well studied by Barber & Olinger (1931) in a certain region of the African Coast.

" 9. The *Anopheles gambiae* present in Brazil (State of Rio G. do Norte) develops itself easily in sweet-water containing *Pistia stratiotes*. At temperatures between 21 and 30°C., in December, the life-cycle is as follows :—

a.	Period of incubation of eggs ...	24 to 30 hours.
b.	Larval period	10 to 14 days.
c.	Pupal period	23 to 26 hours.

The food of larvae cultivated in the laboratory of Natal (Brazil), consisted of small particles of bread-crumb and thoracic fragments of *Musca domestica*, besides organic material coming from natural foci . . . . . .

" 18. The larvae of *A. gambiae* of one day of age die at the end of four hours, when put in a mixture of sea-water (50 per cent.)+sweet-water (50 per cent.). The larvae of three days of age also die at the end of four hours, when put in a mixture of sea-water (30 per cent.)+ sweet-water (70 per cent.).

" 19. The most important breeding places of the larvae of *Anopheles gambiae* in Brazil consist of collections of sweet, stagnant and clear water, exposed to the action of sunlight and covered by aquatic vegetation mostly represented by *Pistia stratiotes*.

" The watering-troughs for animals, the small pools formed on the bed of dry rivers, the wooden washing-tubs, introduced into the soil and known as ' olheiros,' the clay or wooden barrels, introduced into the soil and used for the irrigation of plants cultivated in the kitchen-garden, the brooks of slow current near human dwellings, and the banks of lakes are important foci of *A. gambiae* in the North-East of Brazil."

Cova-Garcia (Pablo). Notas sobre los anofelinos de Venezuela y su identificación. [**The Anophelines of Venezuela.**]—*Publicaciones de la Division de Malariologia.* Ministerio de Sanidad y Asistencia Social. Caracas. 1939. Jan. 15. No. 2. 34 pp. With 10 plates. [37 refs.]

Le Gaonach (J.). Un foyer de paludisme au Hoggar (Tahifet). [**A Malaria Centre in Hoggar (Tahifet).**]—*Arch. Inst. Pasteur d'Algérie.* 1939. Sept. Vol. 17. No. 3. pp. 438–441. With 2 figs. on 1 plate.

Tahifet is a small, poor village of recent construction in Hoggar, a mountainous region of the central Sahara, about 1,500 metres above sea-level, with a mostly negroid population of 130. Of 22 individuals, not suffering from fever and selected at random, and varying in age from 2 to 30, 17 were found to harbour malaria parasites, 8 *P. vivax* and 9 *P. falciparum*. The only anopheline found breeding was *A. sergenti* whose area of distribution thus extends as far as the central Sahara. *N. W.*

Roy (D. N.). **The Importance of *A. varuna* Iyengar as a Carrier of Malaria in Bally (Calcutta).**—*Jl. Malaria Inst. of India.* 1939. Sept. Vol. 2. No. 3. pp. 239–242. With 1 chart.

Bally is a mill area near Calcutta about half a square mile in extent. The species of anophelines found breeding locally were *sundaicus, subpictus, vagus, annularis, ramsayi, hyrcanus* var. *nigerrimus, varuna* and *aconitus*. One adult *A. philippinensis* and two adult *A. pallidus* were also found. The number of adult females of all species dissected was 1,925. The only species found infected was *A. varuna*, 4 out of 113. All four had gland infections. Two were found infected in December and two in January. Malaria appears to be transmitted throughout the year. *A. sundaicus* does not appear to be a local vector of importance. The spleen index was 12·5 in 415 children examined.

N. W.

Afridi (M. K.), Jaswant Singh & Harwant Singh. **Food Preferences of Anopheles Mosquitoes in the Delhi Urban Area.**—*Jl. Malaria Inst. of India.* 1939. Sept. Vol. 2. No. 3. pp. 219–228.

During two successive malaria seasons anophelines were caught in catching stations in Delhi urban area and in three adjacent villages. The stomach contents of 8,314 females were examined by the precipitin test, the sera used being anti-human, horse, pig, sheep and cow. There were 7,249 positive reactions. Of the four species examined, *A. culicifacies, A. stephensi, A. subpictus* and *A. annularis*, only the first two were found to contain human blood and this in but small percentage of the total examined. In the two years 5,026 *A. culicifacies* gave positive results with one or more sera ; of this number only 83, 1·6 per cent., reacted with anti-human serum. Of 360 positively-reacting *A. stephensi* 5 were human-positive, 1·39 per cent. In the three villages the percentage of mosquitoes containing human blood varied inversely

with the proportion of cattle to the human population. Only 39 *A. annularis* were examined; all reacted positively with anti-cow serum. *N. W.*

Junior (Peregrino). Impaludismo e sistema retículo endotelial. [**Malaria and the Reticulo-Endothelial System.**]—*Africa Méd.* Lisbon. 1939. Nov. Vol. 5. No. 11. pp. 219–228.

This lecture deals with the histology, physiology and pathology of the reticulo-endothelial system and the bearing of recent research concerning a cycle of development of Plasmodia in that system on our conceptions of the pathogenesis of malaria. *N. W.*

Mosna (Ezio). Contributo allo studio dell'immunità dell'infezione malarica. [**Contribution to the Study of Malarial Immunity.**]—*Rendiconti Istituto di Sanità Pubblica.* Rome. 1939. Vol. 2. Pt. 2. pp. 435–444. [14 refs.]

This paper was originally published in the *Riv. di Parassit.*, 1938, Dec., Vol. 2, No. 4, pp. 327–337, and was abstracted in this *Bulletin*, 1939, Vol. 36, p. 927.

Try (H. T.). La réaction de Bordet-Wassermann dans le paludisme. [**The Wassermann Reaction in Malaria.**]—*Rev. Méd. Française d'Extrême-Orient.* 1939. Oct. No. 8. pp. 1065–1068. [12 refs.] [Summary appears also in *Bulletin of Hygiene.*]

The author tested the sera of 246 malaria patients by the Bordet-Wassermann and by the Vernes reactions, the blood being taken when the temperature was normal and the patient fasting. Twenty-nine gave positive W.R., or 11·78 per cent.; another four were doubtful and are disregarded; thirty were positive with the Vernes test (12·19 per cent.) and three doubtful. The results of the former (Wassermann) test are given in more detail. Of 97 with subtertian malaria four were strongly and another four weakly positive (8·2 per cent.); of 110 with benign tertian eight were strongly and five others weakly positive (11·8 per cent.), and of 39 with quartan malaria five were definitely and three weakly positive (20·5 per cent.); the last thus giving a much higher proportion of positive reactions than either of the others. The author concludes that in places where malaria is endemic, Tonking for example, syphilis should only be diagnosed after repeated tests and by more than one method.

In the discussion which followed Dr. Ch. Massias combated the author's findings, or at least his interpretation of them. Examination of all patients coming to hospital, whatever the cause, would give an equally high proportion of positives, perhaps even higher; examination of thousands of sera from patients attending for confinement revealed some 25 per cent. positive to the W.R., although they came for a "normal act" and not on account of any disease. He stated categorically that in his (Massias's) experience "malaria had no action whatever on the W.R., whether in the febrile attacks or in the afebrile intervals" and that "no infection other than syphilis can give rise to a

positive reaction," though another infection or trauma may reactivate a latent syphilitic condition. [See *Bulletin of Hygiene*, 1939, Vol. 14, p. 619.] *H. H. S.*

MATSUNOBU (M.). Beiträge zur Hämatologie der Malariakranken. IV. Mitteilung: Ueber die hämatopoetische Funktion von dem Gesichtpunkte von O_2–Verbrauch der Erythrozyten und Retikulozytenzahl in Blut u. Knochenmark. [**Oxygen Consumption of Erythrocytes, and Reticulocytosis, in the Blood and Bone Marrow in Malaria.**]—*Taiwan Igakkai Zassi* (*Jl. Med. Assoc. Formosa*). 1939. Nov. Vol. 38. No. 11. [In Japanese pp. 1586–1595. With 2 charts. [13 refs.] German summary pp. 1595–1596.]

Oxygen consumption of the red cells after two hours' incubation in healthy persons was found to average 26·41 cmm. for men and 24·16 cmm. for women according to Warburg's method. In the stages of fever and convalescence it was increased to 34·28 cmm. and 29·63 cmm. respectively. In the fever-free interval it was 22·75 cmm. Reticulocytes in the peripheral blood and marrow were increased during fever and convalescence. In anaemias and other fevers it was found that increased oxygen consumption occurred where reticulocytes were increased. It was thus shown that the haematopoietic function is increased during malaria fever, sinks to normal in the afebrile interval and increases again during convalescence, in both benign and malignant tertian infection. *C. W.*

FONDÉ (George H.) & FONDÉ (Edgar C.). **Chronic Malaria. A Clinical Consideration.**—*Arch. Intern. Med.* 1939. Dec. Vol. 64. No. 6. pp. 1156–1169. [16 refs.]

The conception of chronic malaria in this paper is based on observations made during 42 years of active practice. Chronic malaria is not always easy to recognize; it tends to become asymptomatic. There are no geographic limits to chronic forms of malaria. Two clinical types may be recognized, reactive and non-reactive. In the latter the patient's defensive powers are exhausted; diagnosis is difficult. There is advanced organic degeneration. In making a diagnosis of chronic malaria the taking of an exhaustive history, a complete physical examination, specific drug tests and laboratory procedures are all important. In the atypical phase of the disease a clinically observed periodicity of seven to ten days is common. The manifestations of chronic malaria are so protean that the symptom complex of almost any disease can be simulated. The authors give a list of a number of conditions with which chronic malaria may be confused. Various clinical phases of chronic malaria are well described.

Both general and specific treatments are dealt with at some length. For the latter the authors favour alternate courses of atebrin and quinine. Prolonged treatment is necessary. Treatment is outlined for the attack period, a maintenance period and a consolidation period. In most cases it is necessary to extend the treatment of malaria over two to three years. In non-reactive cases specific drugs should be used with caution. The leucocyte count should improve after the administration of atebrin or quinine; if the leucocytes are decreased specific drugs should be withheld. The authors raise objections to "standardized treatments" of malaria. *N. W.*

Chopra (R. N.), Hayter (R. T. M.) & Sen (B.). **M. & B. 693 in Indian Strains of Malaria.**—*Indian Med. Gaz.* 1939. Nov. Vol. 74. No. 11. pp. 658–660.

The authors have treated 12 cases of malaria with M. & B. 693, seven benign tertian, four malignant tertian and one quartan. The drug was given in tablet form by mouth. Doses of 4 gm. daily for five days controlled the symptoms of the disease, caused the disappearance from the blood of sexual and asexual forms of *P. vivax* and of asexual forms of *P. falciparum*. When smaller doses were used recrudescences occurred within a fortnight. In the *P. malariae* infection parasites were still present in the peripheral blood two days after the completion of treatment ; this patient received only 1·5 gm. a day for five days. [See also this *Bulletin*, 1940, Vol. 37, pp. 185, 186.]

N. W.

Manca (Salvatore). Lo jodo-mercurato di manganese nella profilassi e nella terapia della malaria cronica recidividante. [**Manganese Iodo-Mercurate in the Prevention and Treatment of Chronic Relapsing Malaria.**]—*Riv. di Malariologia.* Sez. I. 1939. Vol. 18. No. 5. pp. 313–328. French summary. [36 refs.]

Thirty-five tuberculous patients suffering from chronic malaria and 30 non-tuberculous chronic malaria patients were treated with M_3 (manganese iodo-mercurate). Ten healthy persons also received the treatment as a prophylactic. The drug was given in pill form on alternate days in the morning before any food was taken. The dose was progressively increased from one to eight pills. The patients were kept under observations for four months from the end of treatment. One hundred other patients in the sanatorium served as a control ; among these were six cases of primary malaria infection during five months June to October inclusive. Of the 35 tuberculous chronic malaria patients treated five had malaria relapses : there were no relapses among the non-tuberculous chronic malaria cases treated. The number of healthy individuals treated was too small to justify definite conclusions but the author states that the prophylactic action of M_3 is not immediate ; infection may occur during treatment. From the first to the sixth month after treatment the prophylactic value of the remedy becomes evident. The author believes that the action of the drug is on the reticulo-endothelial system and that there is no direct action on sporozoites. The tonic action of the drug on the non-tuberculous chronic malaria patients was marked. The drug was well tolerated. [See also this *Bulletin*, 1938, Vol. 35, p. 31, and 1939, Vol. 36, p. 262.]

N. W.

Chopra (R. N.) & Basu (B. C.). **Failure of "M_3" in Prophylaxis of Indian Strains of Malaria.**—*Jl. Malaria Inst. of India.* 1939. Sept. Vol. 2. No. 3. pp. 253–255.

M_3 is composed of mercuric manganese iodide and concentrated extract of spleen and is manufactured by the Biochemical Institute of Milan. Eight volunteers received treatment with this drug on alternate days over a period of a month. The initial dose was one pill ; this dose was regularly increased, the final two doses each consisting of 8 pills. Batches of *A. stephensi* infected by *P. falciparum* were fed

on these volunteers either at the beginning of treatment, or just after the completion of treatment, or one month, or two months, after the completion of treatment. In all cases infection took place after normal incubation periods. [See also this *Bulletin*, 1939, Vol. 36, p. 262.]

N. W.

Faiguenbaum (Jacobo). El tratamiento de Ascoli en el paludismo crónico. [**Ascoli's Treatment of Chronic Malaria.**]—*Rev. Chilena de Hig. y Med. Preventiva.* 1939. Jan.–Mar. Vol. 2. No. 1–3. pp. 5–16. [20 refs.]

This paper contains a description of Ascoli's method of treatment. The author treated 126 cases of chronic malaria and nine recent infections by this method, an experience which leads him to write enthusiastically of its value. *N. W.*

Diamanti (Giovanni). Sulla cura delle splenomegalie malariche. [**Treatment of Malarial Splenomegaly.**]—*Arch. Ital. Sci. Med. Colon. e Parassit.* 1939. Sept. Vol. 20. No. 9. pp. 521–529. With 16 figs.

The author describes eight cases treated by Ascoli's method. Two long-standing cases of malarial splenomegaly failed to respond to the treatment. In the six other cases the reduction of the size of the acute malarial spleen was either very marked or complete. The mechanism of adrenalin treatment is discussed. *N. W.*

Paunescu-Podeanu (A.) & Carangiu (O.). Un cas de paludisme traité et guéri exclusivement par les injections intraveineuses d'adrénaline (Ascoli). [**Case of Malaria cured Exclusively by Ascoli's Method.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Bucarest.* 1939. July. Vol. 21. No. 7. pp. 286–290.

Russell (Paul F.) & Knipe (Fred W.). **Malaria Control by Spray-Killing Adult Mosquitoes. First Season's Results.**—*Jl. Malaria Inst. of India.* 1939. Sept. Vol. 2. No. 3. pp. 229–237. With 2 figs. on 1 plate.

This experiment in malaria control by spraying was carried out in a village in Pattukkottai Taluk, Tanjore District, Madras Presidency [see this *Bulletin* 1939, Vol. 36, p. 131]. Most of the houses were thatched and had mud walls with partly open sides. The spray used consisted of kerosene 19 parts, pyrocide 20 (pyrethrum extract), 1 part. Spray-killing adult mosquitoes once a week from June to December prevented transmission of malaria to a marked extent. The spleen and parasite rates in the treated village in November 1938 were 24·0 and 11·5 per cent. as compared with 61 and 52 per cent. in a comparable adjacent untreated village. Some houses were sprayed twice a week and in these the results were still more striking. The total cost of the

measure, about one shilling and fivepence per head, was higher than such a village could be expected to defray. [See also this *Bulletin*, 1937, Vol. 34, p. 58, and 1938, Vol. 35, p. 901]. *N. W.*

BANERJEA (A. C.). **The Gumti Weir, Lucknow.**—*Jl. Malaria Inst. of India.* 1939. Sept. Vol. 2. No. 3. pp. 257–259. With 1 plate.

The Gumti Weir at Lucknow was constructed to provide sufficient head of water for the city water supply during the dry season, when the shutters of the weir are kept raised except for seven hours once a week. The rapid fall in the water level caused by the weekly lowering of the gates results in a flushing of the drains discharging into the river above the weir; mosquito larvae are washed away from them and from backwaters and margins of the river. *N. W.*

DANILOVA (M. I.) & BUDUIMKO (F. A.). [Essai d'utilisation de l'acidole dans la lutte antilarvaire.] [**Acidol as a Larvicide.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1939. Vol. 8. No. 2. pp. 177–178. [In Russian.] [Summarized in *Rev. Applied Entom.* Ser. B. 1940. Jan. Vol. 28. Pt. 1. p. 8.]

" In the summer of 1938, laboratory and small-scale field experiments were carried out in and near Rostov-on-Don on the control of larvae and pupae of *Anopheles maculipennis*, Mg., by means of acidol, which is a mixture of naphthene acids obtained in the process of distillation of petroleum oils. The sample tested came from Batum, and no analysis was made of its chemical composition or physical properties. It proved to be highly toxic to the larvae and pupae, and gave complete mortality in 2–24 hours when it was poured on to the surface of the water at a rate equivalent to 32·4 lb. per acre and the temperature of the water was 25–31°C. [77–87·8°F.]. It formed a thin film that did not break up for three days. At water temperatures below 17°C. [62·6°F.] it did not spread, but formed thick drops, and the larvae survived."

PUBLIC WORKS. 1939. Sept. Vol. 70. No. 9. p. 28.—**New Type Paris Green for Culex and Anopheles Mosquito Control.** [Summary taken from *Public Health Engineering Abstr.* Washington. 1940. Feb. Vol. 20. No. 2. p. 13. Signed M. S. CAMPBELL.]

The relative toxicity of any arsenical depends upon its fineness.

Ordinary Paris green has a maximum particle size of about 20 microns and passes about 3 per cent. through filter paper. The new type of Paris green referred to (Ansbacher's subsurface floating) has a maximum particle size of two microns and about 15 per cent. will pass through filter paper.

The subsurface Paris green is lighter and when dusted on water will float on the surface for several hours, some finally passing through the surface film and floating directly under the film.

It is believed that the new Paris green has the advantage of controlling anopheles better than the regular Paris green, controlling culex as well as anopheles, requiring less for control and extending the period between applications.

i. Serguiev (P. G.), Nabokov (V. A.), Zeifert (J. A.) & Kachalova (E. K.). Nouveau pulvérisateur à moteur du système de P. G. Serguiev et V. A. Nabokov "Serna-2" (constructeur-ingenieur J. A. Zejfert) pour la lutte antilarvaire. [**New Motor Pulverizer for combating Mosquito Larvae.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1939. Vol. 8. No. 3. [In Russian pp. 288–298. With 4 figs.]

ii. Konj (J. S.) & Poleshko (G. V.). Résultats des épreuves préalables du pulvérisateur à moteur "Serna-2" dans la région de Kharkov en 1938. [**Results of Tests with Motor Pulverizer.**]—*Ibid.* [In Russian pp. 299–302.]

i. In the first paper a detailed description is given of a new motor pulverizer ("Serna-2") designed and constructed by the authors for use in the destruction of mosquito larvae. The apparatus—illustrated by three diagrams and two photographs—consists of a vertical two-stroke single cylinder 4·5 h.p. petrol motor which drives the pulverizer proper. This comprises (1) tank to hold the powdered larvicidal mixture; (2) mechanism for the conveyance and dosage of the powder, situated at the base of the tank; (3) gear-box with worm-screw for turning the conveyor; (4) ventilator shaft with clutch for connexion to the motor shaft; (5) ventilator connected to conveyor by a suction pipe and terminating in an outflow pipe, from which the powder is discharged, the degree of scattering being regulated by different kinds of detachable nozzles. The whole apparatus is mounted on a frame and can be carried on a vehicle or on a launch. Detailed instructions are given for working the pulverizer and for estimating the consumption of the larvicide (Paris green). Preliminary tests have shown that by using "Serna-2" under different conditions, 100 per cent. mortality of mosquito larvae can be obtained over an area of water up to 50 metres in breadth.

ii. The second paper deals with field tests of the motor pulverizer "Serna-2," which proved to be quite satisfactory. The new apparatus showed itself in every way superior to the manual pulverizer. It permits the efficient treatment of larger surfaces of water (thus 16 hectares can be dealt with in 1 hour with the apparatus running 8 kilometres per hour and spreading the larvicide—1 part Paris green to 9 parts kaolin powder—over an area 20 metres wide) and there is considerable economy in man-power (only 2 men are required) and in cost. *C. A. Hoare.*

i. Russell (Paul F.) & Jacob (V. P.). **Some Experiments with a Cheap Method of treating Casuarina-Pits with Paris Green to control Anopheles Breeding.**—*Jl. Malaria Inst. of India.* 1939. Sept. Vol. 2. No. 3. pp. 261–271. With 3 figs. on 2 plates.

ii. —— & ——. **Some Experiments in the Use of Fish to control Anopheles Breeding in Casuarina-Pits.**—*Ibid.* pp. 273–291. With 6 figs. on 3 plates.

iii. —— & ——. **Some Experiments in the Naturalistic Control of Anopheles Breeding in Casuarina-Pits.**—*Ibid.* pp. 293–313. With 5 figs. on 3 plates.

Casuarina-pits are shallow wells the water of which is used for watering young casuarina trees. The part these wells play in affording feeding facilities for anophelines in the Ennore-Nellore

coastal area, just north of Madras City, has been previously described by the authors [see this *Bulletin*, 1940, Vol. 37, p. 53].

i. Experiments were made with a cheap and simple method of applying Paris green. About 150 cc. of sand obtained by the side of the pit are mixed with 1·5 cc. of Paris green. The mixture is then distributed over the surface of the water. The labourer employed on the work carries two cartridge belts, each holding 25 small stoppered vials: each vial contains 1·5 cc. of Paris green. The only other equipment is a tin dipper of 200 cc. capacity. The mixing is done in the dipper with a small stick. The method is obviously limited to sandy places such as is the casuarina growing area in question. When the interval between successive applications was six days or less a good degree of anopheline control was secured. Culex breeding was not affected.

ii. This is an account of attempts to control mosquito breeding in casuarina-pits by stocking them with larvivorous fish. *Gambusia affinis* was effective, much more effective than local species of fish.

iii. Various "naturalistic" methods of anopheline control in casuarina-pits have been tried, pollution of water with various vegetable substances and manure, agitation of the water, shading, and changing the flora of the water. These experiments are fully described. None gave very satisfactory results: the use of Gambusia was much more effective than any of them. *N. W.*

Colignon (E.). La campagne antipaludique de 1938 dans le département d'Alger. [**The Anti-malarial Campaign of 1938 in the Department of Algiers.**]—*Arch. Inst. Pasteur d'Algérie*. 1939. Sept. Vol. 17. No. 3. pp. 442–456. With 2 graphs & 10 figs. on 5 plates.

Ambialet (R.). La campagne antipaludique de 1938 dans le département de Constantine. [**The Anti-malarial Campaign of 1938 in the Department of Constantine.**]—*Arch. Inst. Pasteur d'Algérie*. 1939. Sept. Vol. 17. No. 3. pp. 457–466. With 8 figs. on 4 plates.

Causey (O. R.). **The Effect of Splenectomy on the Course of Malarial Infection in Canaries.**—*Amer. Jl. Hyg.* 1939. Nov. Vol. 30. No. 3. Sect. C. pp. 93–99. [10 refs.]

It was found that the course of the malarial infection produced in canaries by the inoculation of *P. cathemerium*-infected blood of another canary was uninfluenced by a previous splenectomy. The infection is the same whether the spleen is present or not. On the other hand if a splenectomized canary is inoculated with the blood of an infected duck a normal infection is produced, whereas non-splenectomized canaries similarly inoculated failed to show parasites in the blood. It is thought that the difference is due rather to the removal by the spleen of foreign red blood cells than to any destructive action on the parasites. The author thinks that this factor has to be taken into account when tests for immunity involve the injection of foreign blood corpuscles as, for instance, when the blood of one monkey species is inoculated into another. *C. M. Wenyon.*

HEGNER (Robert) & DOBLER (Marian). **Attempts to obtain Passive Immunity in Avian Malaria with Blood Serum and Spleen.**—*Amer. Jl. Hyg.* 1939. Nov. Vol. 30. No. 3. Sect. C. pp. 81–91. With 4 figs.

An attempt was made to confer passive immunity on canaries by the inoculation of serum or spleen emulsion from canaries infected with *P. cathemerium*. Later the birds were inoculated with the same strain of parasites and from the results obtained it would appear that some slight degree of immunity had been produced. It was evident that the specific protective substances were present in the serum and spleen in low concentrations only. *C. M. W.*

HERMAN (Carlton M.) & GOLDFARB (Alvin I.). **Temporary Infections with *Plasmodium circumflexum* in Splenectomized Chicks.**—*Amer. Jl. Trop. Med.* 1939. Nov. Vol. 19. No. 6. pp. 595–598.

It having been shown by MANWELL (1933) that a temporary infection of *P. circumflexum* could be produced in chicks by inoculating blood from an infected canary, in which the parasite is readily maintained, the author decided to test the effect of similar inoculations into splenectomized chicks. In these again only low-grade short-lived infections were obtained, the removal of the spleen having had no influence on the degree of infection produced. *C. M. W.*

MANWELL (Reginald D.) & GOLDSTEIN (Frederick). **Strain Immunity in Avian Malaria.**—*Amer. Jl. Hyg.* 1939. Nov. Vol. 30. No. 3. Sect. C. pp. 115–122. [18 refs.]

A careful study of six strains of *P. circumflexum* was made in 263 canaries with a view to testing the strain immunity. Superinfections of any one of four strains which were isolated from wild birds near Syracuse, N.Y., conferred an immunity against the others, though this was more marked against the homologous strain. The two other strains isolated elsewhere gave some mutual protection but were often uninfluenced by a previous infection with one or other of the four Syracuse strains. It was also found that the small malarial parasite *P. rouxi* produced a strong immunity to *P. circumflexum*, but the reverse was not the case. *C. M. W.*

WOLFSON (Fruma). **Morphological Differences in *Plasmodium relictum* in Canaries and Ducks** (*Anas buschas domestica*).—*Amer. Jl. Hyg.* 1939. Nov. Vol. 30. No. 3. Sect. C. pp. 123–124. With 7 figs.

A strain of *Plasmodium relictum* was successfully carried on in ducks through thirteen passages. In some of the ducks the presence of parasites could be determined only by inoculating canaries ; in other cases visible infections were produced. In the canary the gametocytes typically displaced the host cell nucleus and were themselves rounded bodies. In the duck there was a marked tendency for the gametocytes to surround the nucleus, which offered some resistance to displacement. When the strain was inoculated back to canaries only mild infections resulted. *C. M. W.*

Manwell (Reginald D.) & Voter (Muriel A.). **Periodicity in the Asexual Cycle of *Plasmodium nucleophilum* with Additional Notes on this Species.**—*Amer. Jl. Trop. Med.* 1939. Nov. Vol. 19. No. 6. pp. 531–545. With 3 text figs. & 20 figs. on 1 plate. [25 refs.]

A study of periodicity of reproduction of *P. nucleophilum* in 11 canaries has shown that segmentation occurs every 24 hours and has its peak between 10 a.m. and 5 p.m. The proportion of schizonts to other forms is low, frequently not exceeding 10 per cent. The number of merozoites varies from 3 to 10, the average being about six. Mature gametocytes may be found at any time during the 24 hours, but the peak is a few hours after that of the schizonts. Exoerythrocytic schizonts were not found. A half-tone plate shows the parasite in its various stages of development. The characters are slightly different from those given in the original description of this parasite by Manwell in 1935, though it is the same strain. *C. M. W.*

Fulton (J. D.). **Experiments on the Utilization of Sugars by Malarial Parasites** (*Plasmodium knowlesi*).—*Ann. Trop. Med. & Parasit.* 1939. Dec. 30. Vol. 33. Nos. 3 & 4. pp. 217–227. [16 refs.]

In the original work on the cultivation of malarial parasites Bass and Johns (1912) noted that for successful culture glucose or maltose should be present in the medium. In the paper under review the author describes experiments carried out by the respiratory methods elaborated by Christophers and Fulton (1938, 1939) to discover the capacity of *P. knowlesi* to utilize various sugars by oxidation. It was found that glucose, laevulose, maltose, mannose and especially glycerol were oxidized as indicated by an increase of the oxygen taken up by the parasites. All these substances have a common chemical grouping in the molecule. It was shown that the blood-sugar level of monkeys with heavy infections was generally much lower than in normal animals, while the liver-glycogen store was depleted. During the metabolism of glucose the different phosphorus fractions were estimated and no evidence of phosphorylation of the sugar by the parasites was found. [See also this *Bulletin*, 1938, Vol. 35, pp. 709, 711, and 1940, Vol. 37, p. 190.] *C. M. W.*

Rodhain (J.) & Lassman (P.). Le comportement différent de *Plasmodium cynomolgi* Mayer et de *Plasmodium gonderi* Rodhain et Van den Berghe vis-à-vis des réticulocytes. [**The Different Behaviour of *P. cynomolgi* and *P. gonderi* as regards the Infection of Reticulocytes.**]—*C. R. Soc. Biol.* 1939. Vol. 132. No. 23. pp. 71–75. With 2 figs.

Three species of monkey malarial parasites have been studied in *Macacus rhesus* from the point of view of their tendency to infect reticulocytes in preference to other red cells. Two of these, *Plasmodium knowlesi*, which produces an intense infection in the monkey, and *P. cynomolgi*, which gives rise to a mild infection, do not appear to have any predilection for reticulocytes, whereas *P. gonderi*, giving rise to a mild infection, has, like *P. vivax* of man, a marked tendency to infect these cells. It seems clear that this feature is a specific one and in no way related to virulence or pathogenicity.

C. M. W.

VENOMS AND ANTIVENENES.

Précis of Abstracts in this Section.

Snakes.—Rosenfeld and Glass (p. 511) show that the blood of certain snakes is toxic to animals even if the snakes are not poisonous, but that the blood has the power of inhibiting the haemorrhagic action of viper venom under certain conditions.

The experiments of Amuchastegui (p. 511) indicate that the action of the venom of *Bothrops alternatus* on the circulatory system is primarily on the peripheral vessels and that the cardiac manifestations observed are secondary to the resulting anoxaemia. On the other hand he finds (p. 512) that the venom of *Naja tripudians* has an early and severe action on the myocardium, which is primary, and that the peripheral changes are secondary. De (p. 512) points out that the haemolytic activity of cobra haemolysin is maximum at *p*H 7·6. Haemolytic activity is increased by heating at 60°C. for one hour, by certain lipoids, egg albumin, lecithin, low concentrations of $CaCl_2$ and glycine. It is diminished by normal sera of certain animals, certain lipoids, casein, cholesterol, high concentrations of $CaCl_2$, by $PbCl_2$, $BaCl_2$ and by $HgCl_2$ on long standing. He (p. 513) describes the action of iodine and other chemical substances on crude venom and purified haemolysin.

Grasset and Schaafsma (p. 513) give a comprehensive description of the properties of the venom of *Dispholidus typus*, which resemble those of the Family Viperidae rather than of the Colubridae, to which the snake belongs on zoological grounds. The principal actions *in vivo* are coagulant and proteolytic. Chin (p. 514) shows that injection of *Trimeresurus mucrosquamatus* venom increases the lactic acid content of rabbit blood.

Wense (p. 514) quotes experiments which do not support the theory that the action of certain snake venoms resembles that of saponin.

Black (p. 515) discusses the use of cobra venom for the relief of intractable pain. The neurotoxin probably acts on the nerve centres of the brain ; the onset of analgesia is slow but its duration is long and the margin of safety wide, while there is no tendency to addiction. He quotes his own results. Chopra and Chowhan (p. 515) point out that cobra venom is contraindicated in cardiac and aortic disease and that administration of vitamin B_1 may be a useful adjunct. In discussing the mode of action of the venom they put forward the view that it contains an estrase which assists a similar substance in the plasma, the action of which is to destroy acetylcholine at the nerve endings, thus helping to prevent the transmission of impulses.

Spiders.—Costa and Salveraglio (p. 516) describe the gangrenous process resulting from the bite of *Latrodectus mactans*. Ramírez Enríquez (p. 516) discusses the treatment of the bite of *L. mactans* by means of injections of calcium chloride, the results of which are good. She indicates the pharmacological actions on which the efficacy of the drug may depend. Maxianovitch (p. 517) describes the preparation of antivenene to the venom of a spider of the genus Latrodectus. In the *Public Health Reports* (p. 517) is an account of a heavy infestation of a ship by *Latrodectus mactans* and of the methods of fumigation used to destroy them.

Finlayson (p. 518) describes the effects produced by the bite of *Harpactirella lightfooti*, for the treatment of which he advocates

L. indistinctus antivenene. WATKINS (p. 518) records the symptoms, including tarantism, produced by the bite of *Atrax robustus*. CACCIAPUOTI (p. 518) describes a case of fatal poisoning by a spider of the Family Mygalidae.

Scorpions.—WATERMAN (p. 519) records observations on the feeding habits and parturition of scorpions. BASU (p. 519) describes the symptoms due to scorpion sting and the treatment advised and suggests that antiserum should be prepared against local Indian species. SERGENT (p. 519) gives further examples of the great therapeutic value of scorpion antivenene in N. Africa, even in the cases with critical symptoms. SHULOV (p. 520) shows that antivenene to the Palestine scorpion *Buthus quinquestriatus* may efficiently be prepared by the injection of formalin treated venom.

Ants.—WEBER (p. 520) describes his personal experience of the sting of the ant *Paraponera clavata* which, unlike one received some time before, produced little reaction. *C. W.*

ROSENFELD (Samuel) & GLASS (Sanford). **The Inhibiting Effect of Snake Bloods upon the Hemorrhagic Action of Viper Venoms on Mice.**—*Amer. Jl. Med. Sci.* 1940. Apr. Vol. 199. No. 4. pp. 482–486.

The authors have confirmed the work of previous investigators who have shown that snake blood is toxic to and may cause death in warm blooded animals, but they have also observed that snake blood inhibits the haemorrhage-producing action of the pit viper venoms without, however, preventing death. The venoms used were those of *Crotalus adamanteus*, *Ancistrodon piscivorus* and *Bothrops atrox*; the snake bloods were those of *C. adamanteus* and the non-venomous king snake *Lampropeltis getulus getulus*. The blood of the king snake was more toxic than that of *C. adamanteus*, but neither produced haemorrhages.

Varying amounts of blood and venom were mixed and injected into mice and whereas in mice injected with venom alone there were widespread haemorrhages, in mice injected with blood and venom there was either no haemorrhage or if present it was reduced. The blood is most protective after keeping for about 2 days, fresher and older blood being less effective. Fresh plasma or serum dried at once retain the property until dissolved; heating at 56°C. for half an hour does not destroy the property. No anti-haemorrhagic principle was found in the sera of warm blooded animals. Protocols of the experiments are given.

The authors do not consider this action to be related to that of antivenene, since auto-antibodies are rare, the action appears to be non-specific and the property becomes diminished if the blood is allowed to stand for 4 days. [In this connexion it is interesting to refer to the work of CASTELLANI, this *Bulletin*, 1939, Vol. 36, p. 567.] *C. W.*

AMUCHASTEGUI (Severo R.). Action du venin de *Bothrops alternatus* sur le coeur et la dynamique circulatoire. [**Action of the Venom of *B. alternatus* on the Heart and Circulation.**]—*C. R. Soc. Biol.* 1940. Vol. 133. No. 2. pp. 317–318.

Anaesthetized dogs were studied, either by electrocardiography or by recording the blood pressure in the left ventricle and aorta

after opening the thorax and during the maintenance of artificial respiration. The venom was given either as a single fatal dose or as a succession of smaller doses. Heart action was accelerated or remained rapid, blood pressure fell, systole was shortened. Sinus tachycardia, nodal rhythm, ventricular extrasystole and other electrocardiographic changes were seen, pointing to the general effect on the myocardium, but these were always preceded by the hypotension which commenced immediately after the injection. The primary effect is therefore on the peripheral circulation and the cardiac manifestations are secondary to the resulting anoxaemia. *C. W.*

AMUCHASTEGUI (Severo R.). Action du venin de cobra (*Naja tripudians*) sur le coeur et la dynamique circulatoire. [**Action of the Venom of** *N. tripudians* **on the Heart and Circulation.**]—*C. R. Soc. Biol.* 1940. Vol. 133. No. 2. pp. 318–319.

Investigation was by similar techniques to those described above; the changes in blood pressure resembled those due to the venom of *B. alternatus*, and the venous pressure was raised. The electrocardiograph showed marked changes in conduction and stimulus initiation. Nodal rhythm, auriculo-ventricular blockage, extrasystole, paroxysmal tachycardia and even ventricular fibrillation were seen. The author concludes that the arterial hypotension and venous hypertension indicate myocardial insufficiency and that the electrocardiographic changes, which are produced at once, indicate severe and early action on the myocardium. The action on the myocardium, unlike that of *B. alternatus*, is primary. These findings are not in agreement with those of FELDBERG and KELLAWAY [this *Bulletin*, 1938, Vol. 35, p. 436]. *C. W.*

DE (S. S.). **Studies on Haemolysin of Cobra Venom. Part II. Effect of Different Substances on the Activity of Cobra** (*Naja naja*) **Haemolysin.**—*Indian Jl. Med. Res.* 1940. Jan. Vol. 27. No. 3. pp. 793–806. With 10 graphs. [15 refs.]

"1. The haemolytic activity of cobra haemolysin is maximum at pH 7·6.

"2. When cobra venom solution is heated at 60°C. for an hour its haemolytic activity is not diminished but slightly increased; heating at higher temperature, however, causes loss in haemolytic activity.

"3. Normal sera of the horse, sheep, rabbit, and guinea-pig, inhibit the haemolysis of the red blood cells of rabbit and guinea-pig by cobra venom, inactivated serum behaves similarly but the inhibition was of lower magnitude than the normal serum. Inactivated horse serum slightly accelerates haemolysis.

"4. The lipoids extracted from the sera of guinea-pig and rabbit accelerate the haemolysis of red blood cells of guinea-pig but lipoids from sheep serum cause inhibition.

"5. Casein causes inhibition of haemolysis of red blood cells of guinea-pig, but egg-albumin slightly accelerates its haemolysis.

"6. Lecithin accelerates the haemolysis of red blood cells of guinea-pig by cobra venom and the effect is more marked at pH 7·6 than at pH 6·0, while cholesterol inhibits haemolysis.

"7. Higher concentration of $CaCl_2$ inhibits haemolysis of red blood cells of guinea-pig but lower concentration accelerates haemolysis. $PbCl_2$ and $BaCl_2$ inhibit haemolysis. $HgCl_2$ on long standing in contact with cobra venom inhibits its haemolytic activity. Haemolytic activity of purified haemolysin is increased with the addition of glycine."

De (S. S.). **Studies on Haemolysin of Cobra Venom. Part III. Reversible Inactivation of Haemolysin of Cobra** (*Naja naja*) **Venom.**—*Indian Jl. Med. Res.* 1940. Jan. Vol. 27. No. 3. pp. 807–817. With 6 graphs. [15 refs.]

"1. The haemolytic activity of crude cobra venom solution is first increased but finally depressed on standing in contact with a moderate concentration of iodine solution but with lower concentration the activity increases and no reversal of activity is obtained. The partly inactivated product regains its activity on treatment with H_2S, NaCN, ascorbic acid, cysteine, and reduced glutathione. With purified haemolysin these resulted always in inactivation of the product and its activity was regained with the reagents tried with crude venom.

"2. Behaviour of hydrogen peroxide and ferricyanide is similar to that of iodine but the effect of ferricyanide is less pronounced than that of iodine.

"3. Effect of benzoquinone is rather peculiar, it has no action on crude venom, but depresses the activity of purified haemolysin in 10 minutes which is partially regenerated by hydrogen sulphide.

"4. Cuprous oxide and phenyl-mercuric chloride inactivates purified haemolysin which can be restored by treatment with hydrogen sulphide and reduced glutathione."

Grasset (E.) & Schaafsma (A.). Recherches sur les venins des colubridés opisthoglyphes africains. I. *Dispholidus typus*. Ire Partie. Envenimation expérimentale. Propriétés toxiques et antigéniques. 2e Partie. Neutralisation. Détoxication. Immunisation active et obtention d'un sérum spécifique au moyen de l'anavenin formolé. [**The African Colubridae ; Opisthoglypha. I.** *Dispholidus typus*. **Part 1. Toxic and Antigenic Properties of the Venom ; Part 2. Neutralization, Detoxication, Preparation of Antivenene.**]—*Bull. Soc. Path. Exot.* 1940. Jan. 10 & Feb. 14. Vol. 33. Nos. 1 & 2. pp. 50–64 ; 114–131. [22 refs.]

The descriptions of the African Opisthoglypha hitherto published have been concerned chiefly with zoological and anatomical characters and the authors have therefore now made extensive research into the action of the venom of 36 specimens of *Dispholidus typus* (the boomslang) all captured in S. Africa. In the first part of this paper are given the general characters of the snakes and of the venom. The action of the venom is much more rapid that that of the Proteroglypha, and when injected intravenously into pigeons, produces dyspnoea, incoordination of movement and rapid death from asphyxia. On intramuscular or subcutaneous injection similar symptoms arise more slowly, together with local haemorrhage and necrosis. At autopsy the blood is usually fluid and if collected remains uncoagulated indefinitely, but there are no haemorrhages in the organs or musculature, and haemolysis is not seen.

The m.l.d. for the pigeon is from 0·0001 to 0·001 mgm. by intravenous injection, and the lethal action is swift. The toxicity is considerably greater than that of the Proteroglypha, either African or Asiatic, and is distinguished from them by having no neurotoxic effect such as paralysis of the respiratory centre. The venom causes rapid coagulation of human and animal blood *in vitro*, in minute doses. This property resembles that of the Australian Proteroglypha (Pseudechis, Notechis) and is not possessed by the African and Asiatic (Naja)

species. Serum prepared against these Australian snakes does not, however, protect against *Dispholidus typus*. Haemolysis is not a feature of the action of the venom. There is a definite proteolytic action on gelatin and this is paralleled by the proteolytic action observed *in vivo*; the rapid action of the venom appears to depend on the two toxic fractions, coagulant and proteolytic. The blood of the snake is apparently non-toxic.

The second part of the paper is concerned with antivenene production. It is first shown that the majority of sera prepared against *Naja fiava*, *Bitis arietans*, *Naja tripudians*, *Vipera russelli*, *Denisonia superba*, *Notechis scutatus*, *Vipera aspis* and species of Crotalus and Bothrops, have only a feeble group action in protection against *Dispholidus typus*; the most efficient is a polyvalent serum against the first two, the next a serum against Bothrops. This fact is further evidence that although zoologically *Dispholidus typus* is a member of the Family Colubridae, the properties of its venom are more nearly related to those of the Viperidae, especially Bitis and Bothrops.

Detoxication of the venom, though not complete, may be obtained to a considerable degree by the addition of 1·5 per cent. of formol for 17 days at 37°C. If physiological saline is used as diluent the antigenic properties of the venom are retained and are capable of producing a high degree of immunity in animals, and a primary injection of 3,000 m.l.d. may be tolerated. Under the action of specific antiserum the coagulant property of the venom is eliminated, and the venom is neutralized both *in vitro* and *in vivo*. Specific serotherapy should therefore be adopted. [See also this *Bulletin*, 1939, Vol. 36, p. 863.]

C. W.

Chin (Keisho). Ueber den Einfluss des Giftes von *Trimeresurus mucrosquamatus*, (Cantor) auf den Milchsäuregehalt im Blut des Kaninschens. [**The Action of the Venom of** *T. mucrosquamatus* **on the Blood Lactic Acid of Rabbits.**]—*Taiwan Igakkai Zassi* (*Jl. Med. Assoc. Formosa*). 1940. Feb. Vol. 39. No. 2. [In Japanese pp. 145–162. With 4 charts. [50 refs.] German summary pp. 162–163.]

The author shows that in acute poisoning of the rabbit by the venom of *T. mucrosquamatus* there is a definite increase in the lactic acid content of the blood roughly proportionate in intensity and duration to the amount of venom injected. The effect of this is reduced if the splanchnic nerves are cut, but section of the vagus has no effect. In chronic intoxication with this venom the high lactic acid content observed in the early stages is gradually reduced and this appears to suggest that blood lactic acid may produce tolerance to the venom.

C. W.

Wense (Theodor). Ueber die chemische Natur des Schlangengiftes. Ein Vergleich mit Saponin. [**The Chemical Nature of Snake Venom: a Comparison with Saponin.**]—*Biochem. Ztschr.* 1939. Oct. 20. Vol. 302. No. 5–6. pp. 426–429. With 1 fig. [10 refs.]

It has been stated by Faust that the venom of certain snakes possesses an action similar to that of the sapotoxins, though the work of Bayer and Elbel does not support this view [this *Bulletin*, 1934, Vol. 31, p. 102]. Meurling has shown that the venoms of *Naja tripudians*

and *N. nigricollis* in dilutions of 1 in 5,000 to 1 in 100,000 cause diminution of the action of adrenalin on the perfused frog's heart. The effect of pilocarpine is diminished by venom stronger than 1 in 100,000 but is increased by weaker solutions. Using a similar technique, but with saponin in place of venom the author found that this substance increased the effect of adrenalin but caused no change in that of pilocarpine. The venom of *Vipera berus* was found to have an action similar to but weaker than that of the cobras. The difference between the action of saponin and that of the venoms therefore makes it unlikely that saponin is an essential component of snake venom. *C. W.*

Black (Wm. T.), Jr. **Cobra Venom for the Relief of Pain.**—*Southern Med. Jl.* 1940. Apr. Vol. 33. No. 4. pp. 432–437. With 1 graph. [23 refs.]

The author treated 17 patients with intractable pain, principally from carcinoma of the cervix, with cobra venom. The usual dose given was 5 mouse units, which may be given every other day when once relief is established. Smaller doses are used at the beginning. Variations in individual requirements are, of course, found, and with progressive improvement the dose may be diminished. There is no tendency to addiction and some patients report increase in appetite and improvement in the general condition. No patient developed any inflammatory reaction at the site of the injections. Four patients developed nausea and vomiting but it is thought that these were psychic phenomena due to knowledge of the nature of the injections and the author does not now disclose this to the patients. There were 8 results described as good, 6 as fair and 3 as poor; the average number of injections was 21.

The author inclines to the view that the action is not on the motor or sensory nerve endings but that the neurotoxin acts upon the nerve centres of the brain, probably those of the thalamus. The onset of the analgesia is slow but its duration is long and the margin of safety is wide. *C. W.*

Chopra (R. N.) & Chowhan (J. S.). **The Venom of Indian Cobra (*Naja naja*) in Certain Painful Conditions.**—*Indian Med. Gaz.* 1940. Feb. Vol. 75. No. 2. pp. 69–75. [22 refs.]

The authors discuss the chemical composition of snake venoms and show that the neurotoxic fraction which preponderates in the Indian cobra is responsible for the various clinical uses for which cobra venom has been advocated. It has been thought that the analgesia produced is of central origin, but another view is now put forward. It is known that on stimulation of motor nerves acetylcholine is produced at their endings and carries the impulse to the end organs. The acetylcholine is rapidly destroyed by a specific choline estrase in the plasma and appreciable amounts of estrase have been found in cobra venom. Injection of the venom will therefore increase the plasma estrase content and help to "prevent the transmission of impulses from the nerves to the tissues and *vice versa*. It will in this way cut off the extraordinary and exaggerated sensation or impulses passing between the nerve and the tissue." [This appears to be a *non sequitur*. Is there any evidence that acetylcholine is concerned in the transmission of impulses from the tissues along the sensory

nerves ? To the reviewer the action of venom would only be explicable on this theory if the muscles, through continuous production of acetylcholine, were in a state of continuous and painful contraction.]

The venom used therapeutically was a solution (1 in 10,000) of the venom of *Naja naja*, with 0·25 per cent. carbolic acid, and this contained 10 mouse units per cc. It was fully tested for bacterial sterility. Contraindications are cardiac and aortic disease and the treatment is regarded as incompatible with administration of iodine, gold and silver salts and radioactive substances. Sensitiveness was seen in only a few patients, and in some patients resistant to the venom treatment good results may follow administration of vitamin B_1.

The patients treated were suffering from a diversity of conditions, principally neuritis, sciatica and arthritis, and of 65 treated 23 experienced marked relief, and a further 23 definite relief, 9 slight relief, and 10 no relief. Injections were given intramuscularly twice or thrice weekly in doses ranging from 1 to 20 mouse units. Purified neurotoxin has now been prepared to see if it is more effective than whole cobra venom. *C. W.*

Costa (R. S.) & Salveraglio (F. J.). Nota previa sobre araneismo cutáneo en el Uruguay. [**Cutaneous Manifestations of Spider Bite in Uruguay. Preliminary Note.**]—*Arch. Uruguayos de Med., Cirug. y Especialidades.* 1939. May. Vol. 14. No. 5. pp. 417–430. With 5 figs. [24 refs.]

The pathological effects of the bites of spiders, especially *Latrodectus mactans*, have been classified in various ways by different authors, but Houssay in 1916 recognized two principal effects, nervous and gangrenous. The gangrenous process begins with erythema and oedema going on to a violet colour with blister formation and, in 48 hours, to necrosis and later the formation of a dry black eschar. There is intense pain lasting for several days. Bacteriological examination of the blister fluid is at first negative.

Details of 8 patients are given and five photographs illustrate the local necrotic lesions. It is pointed out that the species of spider responsible is not often determined and in some instances no spider was seen by the patient. The authors are, however, convinced that spiders were responsible for the lesions described. *C. W.*

Ramírez Enríquez (Flora). La picadura del *Latrodectus mactans*. (" Araña capulina " o " viuda negra ".) [**The Bite of** *L. mactans*.] —*Medicina.* Mexico. 1939. June 10. Vol. 19. No. 341. pp. 183–189.

The author describes the effect of the bite of *L. mactans* in man, emphasizing especially the tenseness of the *vientre de madera* or wooden abdomen [see also this *Bulletin*, 1936, Vol. 33, p. 401], and the tetanic symptoms. Oedema of the eyelids and legs occurs, probably as a result of toxic nephritis. After mentioning briefly the treatments usually employed, together with those used by natives, the author goes on to describe the results of treatment with calcium chloride and magnesium chloride in pigeons and man. She shows that the pharmacological action of the venom consists of stimulation of the nervous system with contraction of the abdominal muscles, retardation of the heart beat and of coagulation of the blood and, later, oedema. The

action of calcium chloride on the other hand is in the direction of paralysis of the nervous system, acceleration of the heart beat and of coagulation, and it is used as a diuretic and anti-spasmodic. The venom diminishes peristalsis, causes renal congestion and rigidity of muscles ; magnesium chloride augments peristalsis, causes diuresis and tends to relax rigidity of muscles. In pigeons the drugs caused rapid disappearance of symptoms and the author considers that this result may be due either to antagonistic physiological action or to the formation of innocuous, insoluble compounds between the venom and the drugs.

Three of many human cases are cited in which intravenous injection of the drugs mentioned brought about rapid relief, the results being described as magnificent. Unfortunately the exact dosage is nowhere stated, but it is remarked that the drugs were used in convenient proportions. [See also this *Bulletin*, 1939, Vol. 36, pp. 570, 571.]

C. W.

Maxianovitch (M. I.). Le venin du kara-kourte Lathrodectus 13-guttatus agissant comme antigène ; effectivité de l'antitoxine dans les expériences sur les animaux. [**The Venom of the Kara-Kourte,** *Latrodectus 13-guttatus*, **as Antigen : Efficiency of the Antivenene.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1939. Vol. 8. No. 6. [In Russian pp. 51–63. With 3 figs. French summary p. 64.]

An extract of 10 to 20 venom glands in 1 cc. saline was prepared and formalin was added to a strength of 0·5 to 1 per cent. Detoxication was complete in 7 days at 37°C. and this antivenene was used for the immunization of horses. It was injected until the animals were refractory to about 8 fresh glands, after which fresh glands and finally the bites of as many as 40 spiders simultaneously were used to increase the immunity. The horse serum was then capable of protecting a guineapig against an actual bite and was effective in treatment after the bite of 2 or 3 of the spiders. *C. W.*

Public Health Reports. 1939. Dec. 15. Vol. 54. No. 50. pp. 2195–2196.—**Unusual Infestation of a Ship with Black Widow Spiders.**

At the Miami Quarantine Station the captain of a ship reported heavy infestation with spiders which on examination proved to be *Latrodectus mactans*. The infestation was widespread and adults and egg sacs were found even in the crew's quarters, though no bites were reported. Fumigation with HCN gas was employed and afterwards 174 adults were found dead. In 5 egg sacs dissected the number of eggs and dead spiderlings numbered from 137 to 273. A second fumigation was performed 3 weeks later but even after this several living spiders were found among petrol drums on deck. A third fumigation may be necessary.

So heavy an infestation does not appear to have been reported before ; an ample food supply of cockroaches and extensive safe harbourages in the complex structure of the ship probably accounted for a rapid rate of reproduction. *C. W.*

FINLAYSON (M. H.). ***Harpactirella lightfooti* as a Cause of Spider-Bite in the Union. With a Note on the Biology of *Harpactirella lightfooti* Purcell by** R. SMITHERS.—*South African Med. Jl.* 1939. Dec. 23. Vol. 13. No. 24. pp. 808–810. With 1 fig.

During an investigation on knoopie (or knoppie) spider bite in South Africa [this *Bulletin*, 1936. Vol. 33. p. 402] various instances of so-called "tarantula" bite were reported. Specimens of the spiders were obtained and were found to belong to the genus Harpactira. Later two human cases were reported in which *Harpactirella lightfooti* was considered to be the causal agent. Symptoms consisted of an immediate local burning sensation, a latent period of 2 hours, followed by signs of shock with vomiting and collapse. There was no local reaction. After treatment with morphia and adrenalin recovery was complete in 24 hours.

White mice were killed by the bite of *H. lightfooti*, with symptoms of nervous irritation and convulsions, but a guineapig survived after showing similar symptoms. The extracted venom is extremely labile and is destroyed by the process of extraction employed: grinding the sacs with distilled water, drying at 0°C. over P_2O_5 and redissolving in water. Intravenous injection of *Latrodectus indistinctus* antivenene given to white mice before the bite of *H. lightfooti* appears to give some protection and the use of this serum is advocated in man.

The bite of this spider is evidently not so severe as that of the various species of Latrodectus known as "knoopie-spider."

A description of the spider is given by Smithers. *C. W.*

WATKINS (A. M.). **A Bite by *Atrax robustus*.** [Correspondence.]—*Med. Jl. Australia.* 1939. May 6. 26th Year. Vol. 1. No. 18. p. 710.

The adult male patient was bitten in the ring finger by the trapdoor spider *Atrax robustus*, whose bite is sometimes fatal. The symptoms were mask-like face, staring eyes, dilated pupils, *risus sardonicus*, profuse salivation and tarantism, the execution of short dancing steps. There was no pain. Local treatment with a paste of ammonia and bicarbonate of soda, warmth and copious drinks of hot fresh tea were given and recovery was complete in two days, though he at first felt stiff and sore all over.

The author has never before seen tarantism in spider bite.

C. W.

CASCIAPUOTI (Raffaele). Avvelenamento letale da puntura di *Mygalidae*. [**Fatal Poisoning by a Spider of the Family Mygalidae.**]—*Rass. Sanitaria dell' A.O.I.* Addis Ababa. 1939. Sept. 9. Vol. 1. No. 3. pp. 37–42. With 2 figs.

Specimens of the spider concerned were captured in the Uollo region of Italian East Africa and the author considers them to belong to the Sub-order Tetrapneumoni, Family Mygalidae and probably to the Genus Theraphosa. The spiders are reddish brown and are 8 to 9 cm. in length. A child of 7 was bitten on the left heel and was brought to the author in a condition of shock, with stupor and myosis. There

was profuse sweating and sialorrhoea, choreic movements, rapid breathing and intense thirst. Ecchymoses were seen at the place of the bite, with oedema of the leg and lymphangitis. The heart was dilated, vomiting and the passage of two blood-stained liquid motions had occurred. The child died in coma about eight hours after the bite.

C. W.

WATERMAN (James A.). **Some Observations on the Habits and Life of the Common Scorpion of Trinidad.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1939. June 29. Vol. 33. No. 1. pp. 113–118.

This is a brief but interesting account of the habits of *Tityus trinitatis*, the common scorpion of Trinidad. The feeding habits are described, and it is shown that the sting is only used if the prey struggles so vigorously as to hinder the process of eating. The poison is fatal to all small insects and to other scorpions of the same species, but an insect killed by sting can be ingested with impunity. Parturition was witnessed in one case and demonstrated that scorpions are viviparous, the young being born enveloped in a membrane which is removed by the mother. The young are thereafter encased in a transparent silky coat which is shed, with some difficulty, after a week, during which they are huddled together on the mother's back. *C. W.*

BASU (U. P.). **Observations on Scorpion-Sting and Snake-Bite.**—*Amer. Jl. Trop. Med.* 1939. July. Vol. 19. No. 4. pp. 385–391. With 3 charts & 4 figs.

The author reports 19 cases of scorpion sting admitted to the Calcutta Medical College Hospitals between 1928 and 1937. Of these 13 were children between the ages of 2 and 10, and five of these died. During the same period there were 27 cases of snake bite with 17 deaths. The symptoms in the scorpion cases consisted of intense pains immediately and some hours after the sting, with headache, giddiness, nausea, vomiting and profuse perspiration with chill, which are described as allergic symptoms. In some instances these were followed by unconsciousness, cold extremities, subnormal temperature, muffled heart sounds and feeble pulse. In the fatal cases oedema of the lungs was the usual cause of death.

Treatment consisted of the local application of liq. ammon. fort and novocaine-adrenalin injections, with treatment for shock, and atropine for the pulmonary oedema combined with intravenous glucose and intramuscular calcium. For viperine snake bite calcium and adrenalin were used in addition to serum. The author advises that anti-scorpion serum should be prepared from local species. *C. W.*

SERGENT (Etienne). Sérothérapie antiscorpionique. Deuxième note. Nouvelles observations (1938). [**Anti-Scorpionic Serotherapy.**]—*Arch. Inst. Pasteur d'Algérie.* 1939. Sept. Vol. 17. No. 3. pp. 412–420.

Since the publication of the first therapeutic trials of scorpion antivenene [this *Bulletin*, 1939, Vol. 36, p. 864] 17 medical men in N.

Africa have sent to the author details of 140 cases treated with serum. These have been classified as severe and mild cases and of the severe there were 27 with 23 recoveries and 4 deaths; of the mild 113, all cured. Of the severe cases, in which the symptoms were the same as those found in fatal cases, there have now, therefore, been reported 60, and of these 49, or 81 per cent., have been cured. Details of the 27 new severe cases, in which death was feared, are given; a dose of 40 cc. was administered to some of the children but the more usual dose was 10 to 20 cc. Symptoms were usually greatly relieved in a few minutes, and always within 24 hours in those who recovered. *C. W.*

SHULOV (A.). **The Venom of the Scorpion** *Buthus quinquestriatus* **and the Preparation of an Anti-Serum.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1939. July 28. Vol. 33. No. 2. pp. 253–256.

The only scorpion considered dangerous in Palestine is *Buthus quinquestriatus*, the sting of which was fatal to 4 children in 1938. The venom of this species was treated with formalin (up to 0·5 per cent.) or chloroform and although experiments showed that there was some qualitative difference between these products and the natural sting in regard to toxicity for rats and rabbits (the m.l.d. in the treated preparations depending upon body weight, but in the natural sting not so), it was found that efficient antisera could be produced in rabbits by the use of these preparations.

The natural sting contains a substance which rapidly paralyses the respiratory centre and the lethal dose of this is within wide limits independent of body weight of the animal stung.

The most potent sera were obtained by immunizing with formalin-treated venom or with both chloroform-treated venom and actual stings, and were found to be at least twice as efficient as a commercial serum control. Details of the methods are given. *C. W.*

WEBER (Neal A.). **The Sting of the Ant,** *Paraponera clavata*.—*Science.* 1939. Feb. 10. N.S. Vol. 89. No. 2302. pp. 127–128.

The author was stung by a female *Paraponera clavata* in the Panama Canal Zone. He had previously been stung by a worker ant of the same species in British Guiana [see this *Bulletin*, 1939, Vol. 36, p. 578], but whereas on the first occasion the pain and local reaction were intense, the latter leading to blister formation with subsequent suppuration, the second sting produced only an area of reddening with central oedema, which disappeared the following day, and relatively little pain.

Female ants usually sting more intensely than workers and on this (second) occasion there was every opportunity for the injection of a full dose. The author suggests that there may be a physiological difference unaccompanied by obvious morphological characters, which seems not to have been recorded among ants or related insects, to account for the widely different effects of these two stings. *C. W.*

MISCELLANEOUS.

Trolli (G.). Méthode originale d'assistance médicale aux indigènes en milieu rural appliquée au Congo belge, Fonds Reine Elisabeth pour l'Assistance Médicale aux Indigènes. [**The Application of an Original Method of Medical Assistance to Natives in the Rural Areas of the Belgian Congo. Foréami.**]—*Bruxelles-Méd.* 1939. Dec. 17, 24 & 31. & 1940. Jan. 7. Vol. 20. Nos. 7, 8, 9 & 10. pp. 147–184; 217–253; 272–308; 324–348. With 2 maps. [Refs. in footnotes.]

The author traces the history of Foréami, founded in 1930, an organization which, though working in close collaboration with the Government Medical Service, pursues a separate policy and maintains a separate staff. The Government Service in rural areas is composed of:—(1) Itinerant missions primarily directed against sleeping sickness, (2) Rural dispensaries and dispensaries controlled by religious bodies, (3) Maternity and child welfare establishments, largely staffed by religious bodies. Although these measures had proved their worth, the author, while working on sleeping sickness, conceived the idea that the examination and registration of whole populations in various areas was necessary for a successful campaign against the disease and that such a programme should be extended to cover all diseases. This was obviously impracticable at one time over the whole country of 13 million widely scattered inhabitants, and the suggestion was therefore made that the method should be applied to a limited area at first, to be extended later. A campaign was to be inaugurated to combat the great devastating diseases, sleeping sickness, smallpox, yaws, syphilis, leprosy, tuberculosis, helminthiasis and ulcer, and to reduce maternal and infant mortality, and with this was to be combined a wide movement for social and hygienic improvement. Funds were provided by the Belgian Government and Colonial Ministry and a large contribution was made by Queen Elizabeth.

A preliminary survey of the terrain was made and a division into subsectors effected, and arrangements were carried out by which it was made possible for natives to receive treatment within 15 kilometres of their homes. The first region to be dealt with was the Bas-Congo and in 1934 the Government regarded the position there as so much improved that it could be left. Foréami therefore moved to the Kwango area in 1935. The medical care of the Bas-Congo, of course, remains in the hands of the ordinary Government medical service, but must be maintained with vigilance.

At the height of its activity Foréami disposed of the services of 26 doctors, 23 sanitary workers, 4 medical missionaries and 40 members of religious organizations, together with a trained native staff of 493. It is pointed out that the activities of Foréami include the registration of *all* persons in the area concerned, the periodical examination of *all* persons, the treatment of *all* diseases, the improvement of sanitation, the development of social work and the collection of statistics. A table is given of the persons examined and diseases treated for each year from 1931 to 1938, and in the peak year, 1936, the total examinations numbered 1,156,741, with 4,475 new cases of trypanosomiasis diagnosed.

Interesting figures are given which display the method of working. Each travelling unit consists of one doctor, one sanitary worker, three native microscopists and a number of native dressers. These units

supervise about 30,000 people who are visited twice each year. About 400 people may be examined in one day and it is evident that the examination can only be cursory. It is enough, however, for an expert to detect the principal diseases. The healthy are dismissed briefly, the suspects are given more attention, and the suspects as a rule form one-quarter of the population.

The remaining part of this very full exposition of the aims and achievements of Foréami is concerned with descriptions of the methods adopted and with a statement of the numbers dealt with in connexion with the various diseases, with the results of the campaign for better hygiene and with a statement of the population figures of the districts surveyed. Much of this information has been abstracted already in this *Bulletin* [1934, Vol. 31, p. 326; 1935, Vol. 32, p. 501; 1939, Vol. 36, p. 408]. To those who are interested in the problem of how best European medical control can be applied to native races the series of four papers under review provides food for serious thought. The account is clear and precise. *C. W.*

Congo Belge: Fonds Reine Elisabeth pour l'Assistance Médicale aux Indigènes du Congo Belge. Rapport Annuel 1938 [de Brauwere, Médecin-Directeur]. [**The Foréami Service in the Belgian Congo. Report for 1938.**]—108 pp. With 1 map. Bruxelles: 112 rue du Commerce.

Largely for financial reasons the year 1938 was marked by some reduction in the activities of Foréami and a return to its normal programme after four years of extension to deal with the urgent conditions necessitating its activities in the inhospitable region of Kwango. Nevertheless, the amount of work done was impressive. Pulmonary tuberculosis is more in evidence than formerly, and is contracted in the villages by those who have never left them to seek work in industry. Sleeping sickness [the report of which has been abstracted in this *Bulletin*, 1940, Vol. 37, p. 398] shows considerable regression and is now only serious in localized areas. Child welfare schemes are greatly extended and may be expected to have considerable influence upon infant mortality, as is the case with the successful efforts made by the authorities to improve the nutrition of the natives. The system of rural dispensaries has been extended and there are now 220 of these in addition to 29 larger dispensaries. The native personnel numbers 556.

The total number of natives examined was 898,333; new cases of trypanosomiasis were 2,548 and in all 8,393 were treated, with 3,833 cures. New cases of yaws numbered 1,604; and 2,072 cases of leprosy, 7,037 of ulcer and 76,300 of helminthic infestations were treated. The general morbidity index was 57·7 per cent. as against 41·52 per cent. in 1937.

In 1938, 31,851 deaths were registered, a considerable increase over the 25,754 of 1937, but the reason is probably that the registration methods have improved, though it is thought that there may have been an increased mortality, owing to malnutrition, in certain diseases normally mild. There were no widespread epidemics. It is noteworthy that infant mortality figures have not increased in the same proportion.

The epidemic of spastic paraplegia ["konzo," see this *Bulletin*, 1939, Vol. 36, p. 501] which occurred in 1937 caused, in 200 patients,

death in 16·5 per cent. and permanent sequelae of varying severity in 70·5 per cent. Only 13 per cent. were cured, but two recent severe cases have shown such good progress with treatment by Betaxin and two others with Astreptine that these treatments are now being extended.

Malaria is endemic but the only feasible method of control is by systematic drug treatment and drug prophylaxis.

Further work on the syndrome known locally as Buaki, Kibengi or Katoto [see this *Bulletin*, 1939, Vol. 36, p. 912] has shown that rapid and complete cure can be obtained by giving animal protein in the diet without having recourse to specialized vitamin products. The requirements in animal protein cannot be satisfied except by the encouragement of the rearing of small domestic stock. This, however, is possible, but the principal difficulty is to overcome the native habit of mind which regards stock as currency to be preserved.

In a letter from the Provincial Commissioner of Leopoldville quoted at the end of this report it is pointed out that in the work of Foréami the civilizing and educative forces are even more important than the purely medical work. *C. W.*

Humphries (S. V.). **The Control of Native Diseases in the Belgian Congo.**—*South African Med. Jl.* 1939. Sept. 9. Vol. 13. No. 17. pp. 635–640. With 4 figs. [11 refs.]

The most important endemic diseases of the natives of Central Africa are malaria, trypanosomiasis, helminth infections, leprosy, bilharzia, venereal diseases and yaws; the most important epidemic diseases are probably smallpox and measles.

The author notes the credit due to the Belgian Government for the admirable way in which native sickness has been tackled, with the assistance of the Foréami organization and numerous missions and private societies. "The number of trypanosome infections, of all kinds, early and late, which in 1927 was 5·13 per cent., has fallen to 1·3 per cent. in the epidemic areas, and is approximately 0·6 per cent. of the whole population of the colony." It is noted that the complete medical census of the natives always proves indispensable in seriously affected areas for the tracing, by frequent re-examination, of new cases. The number of centres for treating trypanosomiasis exceeds 1,400.

Syphilis is rapidly decreasing in the towns, where proper treatment is available for all, and in country districts travelling clinics help in this work. Treatment is compulsory and as a last resort, which however is rarely needed, imprisonment may be employed against defaulters.

A description is given of the principles underlying the training of native medical personnel, from native medical assistants who take a six-year course, to *gardes-sanitaires* and *aides-accoucheuses* with four- and two-year courses respectively. All work done by natives is carefully supervised but the degree of responsibility allowed naturally varies.

The Foréami organization has been described before in this *Bulletin* [1935, Vol. 32, p. 501; 1936, Vol. 33, p. 646; 1937, Vol. 34, p. 920; 1939, Vol. 36, p. 408]. It aims at a "complete and progressive cleansing of the country." After five years in the Bas-Congo it now extends to the Kwango district.

During 1937, for a population of 11 millions there were 164 Government medical officers and 106 medical officers to societies and missions.

The author gives credit to the Belgians for their wisdom in recognizing the importance of intensive action to improve the health of the natives, and in comparison speaks of the " short-sightedness of South Africa's native policy." He advocates for the Union, in addition to measures similar to those outlined above, the compulsory possession by natives of certificates of health for the more effective control of disease. [An excellent account of an impressive medical service.] *C. W.*

DIAMANTI (Giovanni). La nosografia della regione del Medio Giuba (residenza di Bardera). [**Diseases of the Middle Juba Region.**]—*Arch. Ital. Sci. Med. Colon. e Parassit.* 1939. Aug. Vol. 20. No. 8. pp. 449–503. With 29 figs. & 1 map.

The inhabitants of this region number about 40,000, of several different tribes which are divided broadly into the pastoral nomadic Somalis and the agricultural negro type. The former obtain their principal foods, milk and meat, from their animals. The chief diseases are malaria, syphilis and tropical ulcer. Subtertian malaria is more frequently found than the others, and is hyperendemic in some parts, being transmitted by *A. gambiae* and *A. funestus*. Syphilis is usually a benign affection, involving almost exclusively the skin and mucous membranes even in the tertiary stage. The author considers that the mildness of the syphilis may be due to the universal malaria contracted at an early age. No neurosyphilis is seen, but there is a condition of " Somali ostealgia " with pain in the long bones which he attributes to secondary syphilis. Gonorrhoea and soft sore are very common.

Tropical phagedaenic ulcer is found chiefly in the poorer classes and especially in women working in the fields. In recent years about one-third of the patient-days in the local hospital have been on account of tropical ulcer. Tuberculosis of the lungs and other parts is not uncommon, and yaws, schistosomiasis, amoebiasis, mycetoma, and elephantiasis are noted as diseases found.

The author discusses possible means by which the heavy disease incidence may be reduced and concludes that the basis of all measures must be the education of the natives. *C. W.*

CARMICHAEL (J.). **Bovine Tuberculosis in the Tropics, with Special Reference to Uganda. Part I.**—*Jl. Comp. Path. & Therap.* 1939. Dec. Vol. 52. Pt. 4. pp. 322–335. With 2 figs. [34 refs.] [Summary appears also in *Bulletin of Hygiene.*]

The author begins with a comprehensive résumé of the reports from India, Tropical Africa and Egypt of tuberculosis in cattle; in general the reported incidence has been small but in recent years the recorded cases have increased, though this does not necessarily mean that the incidence has actually risen. In Uganda no cases were found between 1919 and 1928, but thereafter the figures increased until in 1936, 77 of 231 carcasses of Ankole cattle (33·3 per cent.) and 49 of 7,848 zebu cattle (0·6 per cent.) were found to be diseased. In the Ankole cattle one-half of those diseased show lesions in the thoracic cavity.

The Ankole cattle, with enormous horns and no hump, are of a different species from the humped short-horned zebu cattle, and are only found in parts of Uganda, Tanganyika and the Belgian Congo. Their origin is not known but it is thought that they came first from

Abyssinia. So far as is known no European cattle have ever passed the boundary of the Bahima owners of these animals.

The Ankole cattle are only rarely housed ; in the daytime they roam the short-grass down-like country and at night are driven into thorn bush enclosures in which fires of dried cow dung are lighted to ward off biting insects. The cattle crowd round these fires head to head and it is thought that this close contact and the coughing due to the smoke may facilitate the spread of tuberculous infection. The heavy infection of this one isolated breed of Ankole cattle is an interesting feature ; the question of the relative susceptibility of the Ankole and zebu cattle will be discussed in a later paper.

The author has no doubt that the disease is spreading, and the main portal of entry appears to be the respiratory tract. Generalized lesions are not common but do occur, and the limitation of the disease to glands shows that there is considerable resistance. Of 39 strains of *Myco. tuberculosis* isolated from cattle, all were proved to be of the typical dysgonic bovine type, with normal virulence.

Figures of a series of tuberculin tests are given in which the zebu groups show very much less infection than the Ankole or the mixed breeds. [See also *Bull. of Hyg*, 1939, Vol. 14, p. 215.] *C. W.*

CARMICHAEL (J.). **Pulmonary Tuberculosis in Uganda Natives. A Bacteriological Survey.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1940. Jan. 29. Vol. 33. No. 4. pp. 453–459. [23 refs.] [Summary appears also in *Bulletin of Hygiene.*]

This is a continuation of part of the work abstracted in this *Bulletin*, 1939, Vol. 36, p. 346. The literature on pulmonary tuberculosis in man caused by the bovine type of bacillus is reviewed and the author's investigations in the Uganda cattle (see above) are summarized. The human sputa from which cultures were obtained were received in various stages of decomposition and the author finds that " the tubercle bacillus appears to be able to withstand decomposition under conditions pertaining in Uganda up to at least 7 days. The average temperature during transit would be approximately 75° to 85°F.".

Carmichael has now typed 283 cultures from human sputum and has found four to be of the bovine type, in each case these bovine bacilli were recovered from patients who belong to tribes which own Ankole or mixed Ankole-zebu cattle. In view of the fact that the Ankole cattle are heavily diseased, that their disease is largely confined to the thoracic cavity (see above) and that sick animals share the hut of the owner, conditions are apparently ideal for a bovine-human-bovine cycle, " but for some reason this does not take place and one is forced to consider whether the human lung is in some way resistant to the bovine tubercle bacillus having regard to the fact that the inhalation of bovine organisms in many cases of cattle contact seems inevitable."

A few tuberculin tests on Uganda natives are recorded, but the figures, while appearing to suggest higher rates in the owners of Ankole cattle than in the others, are too small for generalized conclusions to be drawn. It is worth noticing that many of the sputum-positive patients were found in itinerant labourers originating from Ruanda-Urundi in the Belgian Congo, where both surgical and pulmonary tuberculosis are known to be common although there is little evidence of disease in the cattle. [Tuberculosis in imported labourers in East Africa is often seen and may possibly be due to the breaking down, under the stress of

work, of recent " larval " lesions. There is reason to believe that in S. Africa labourers who on recruitment are strongly positive to the tuberculin test break down more frequently than those moderately positive or negative. It may be, as the reviewer has suggested before, that the tuberculin testing of all labour recruits and the exclusion from labour of all *strongly* positive reactors might reduce the subsequent incidence of tuberculous disease in these men.] *C. W.*

MACDONALD (George). **Discussion on Rural Hygiene in the Tropics : Conservancy in Rural Areas.**—*Jl. Roy. San. Inst.* 1939. Dec. Vol. 60. No. 6. pp. 261–265. [Summary appears also in *Bulletin of Hygiene.*]

In the tropics two distinct types of population are the subject of sanitary effort : the village population and the population of estates and mines. The possible conservancy systems are four : the pit, the bored-hole, the bucket type, and the water-flushed system. The pit latrine has not fulfilled expectations, many communities object to it on the ground that it bears evidence of previous use, a fact which, especially among orthodox Hindus, raises caste issues. The bored-hole latrine, of 16-inch diameter, is intended to reach to 5 or 6 feet below the subsoil water level, thus reproducing septic tank action. It may, however, be used at a depth of 20 feet if it is not practicable to reach the subsoil water level, but in this case septic tank action is not possible and the latrine should be closed if evidence of filling appears. [For details of construction see *Bulletin of Hygiene*, 1938, Vol. 13, p. 591.]

It has been found that a maximum distance of travel of *Bact. coli* inoculated into bored-hole latrines in permeable quartzite soil was 70 feet, which gives little risk to wells at 100 feet, and this is regarded as the safe distance except in fissured soils. [But in discussion MATHUR states that in the Punjab observations indicate that contamination has been found to travel a distance of 200 feet.]

The bucket system is so full of disadvantages that it is not recommended if an alternative is possible.

Water-flushed systems are suitable for estate use where continual supervision is possible. The necessary requirements are : sufficient purification to allow safe discharge of effluent into an earth drain, low costs, frequent automatic flushing, a building and floor which can easily be cleaned, ready access from houses and an ample supply of water for ablution purposes (essential for most races in the tropics). The author describes automatically flushed communal latrines of the trough type, which is well adapted to the squatting posture.

The final recommendation for villages and small estates is the bored-hole latrine and for larger villages and estates a water-carriage system.

[The remark on the necessity for ablution water for tropical races is timely, it is used for the cleansing of the anus. But is there enough emphasis laid, in our conservancy schemes, on the necessity for the cleansing of hands after defaecation ?] *C. W.*

GILLANDERS (George). **Discussion on Rural Hygiene in the Tropics : Rural Housing.**—*Jl. Roy. San. Inst.* 1939. Dec. Vol. 60. No. 6. pp. 230–240. With 14 figs.

The author calls attention to the importance of tribal customs and beliefs in connexion with housing and general sanitary measures.

For instance, in some tribes it is not the custom for a man to share a room with his wife, some natives believe that spells may be cast over their excreta, and that emanations from latrines may spread infection. These beliefs must be taken into account in any schemes introduced for native welfare, and may even be turned to useful purpose as in the demonstration that deep latrines confound the witch doctors. In a community in which the average monthly income is only a few shillings it is evident that the building materials advised must be cheap, easily obtained and effective.

In Uganda there is now evidence that the efforts made, including propaganda, health exhibitions and instruction in building, are bearing fruit, and that windows, for instance, are now appearing in native huts.

Experiments have been made with bitumen-covered hessian supported on wooden frames as a roofing material less expensive than corrugated iron and unsuitable for rodents. Details are given and although in the early processes it was found that after a time the dressing became detached, the later preparation of bitumen emulsified in volatile oils applied to the finer texture hessian shows signs of greater success and the whole process is no more expensive than stepped thatching.

For walls pisé-de-terre is advocated and it is noted that a booklet on the subject is available from the Uganda medical department. The necessary materials, other than the moulds, are available in even the remotest village, and the house can, if necessary, be built by the owner himself. Bitumen may be used in place of concrete to cover the floors and provides a damp-proof and probably an ant-proof course for the walls. Ventilation, for those who fear that windows may offer attractive opportunities for spear-throwing enemies, may be provided by a six-inch space at the wall head.

Finally, the author again stresses the importance of the due consideration of the vital factors of economics and native psychology. In discussion MacLeod objects that pisé-de-terre is a difficult and complicated method of building beyond the capacity of the ordinary African to carry out. He advocates the use of sun-dried bricks, walls of which could last for 25 years. [This paper is very sound. There is no doubt that many African natives are willing to adopt a better standard of housing and that careful guidance is necessary to foster this desire.] *C. W.*

Buxton (P. A.). **Temperatures Lethal to the Louse.**—*Brit. Med. Jl.* 1940. Mar. 2. p. 341. With 2 figs.

The author describes the apparatus with which he worked; it consists of a test tube inserted into a thermostat. This is not removed when an experiment is started, but the lice are introduced into it *in situ*; temperatures are measured in a second tube alongside. Humidity was not considered to be of importance in this work.

The lice were in good condition, and the lowest temperatures found to kill all lice, adults and larvae, were 51·5°C. for 5 minutes, 49·5°C. for 10–30 minutes or 46°C. for 45–60 minutes. Females which have been exposed to temperatures just below the lethal lay unfertile eggs. For eggs under 5 days old the lowest lethal temperatures are 53·5°C.

for 5 minutes, 52°C. for 10 minutes or 50°C. for 30 minutes ; with older eggs the lethal temperatures are lower. Collapse of the eggs indicates that they have been subjected to temperatures well above the lethal.

Ordinary laundry processes as applied to cotton goods should generally be enough to kill all stages of the louse, but the temperatures at which woollens are washed are so low that they are probably ineffective. In dry cleaning the solvent itself would almost certainly destroy lice and eggs, and the drying process in hot revolving drums, usually at temperatures far above the lethal, makes this process doubly safe. *C. W.*

SCHLEICHER (Emil Maro). **Estimation of Erythrocytes from a Blood Smear by a " Dry Chamber " Method.**—*Proc. Soc. Experim. Biol. & Med.* 1939. Apr. Vol. 40. No. 4. pp. 536–540. With 4 figs.

Having discarded the first drop after puncture, a drop of blood, of such a size as would about fill a red blood cell diluting pipette to the 0·5 mark, is spread with an even, quick, sure movement on a slide by a spreader 20 mm. wide held at an angle of 45°. The blood smear is then stained in the ordinary way. The count is made using a Zeiss standard routine microscope with the following optical setting : eye piece 10×, Whipple's ocular micrometer 7×7 mm. square, tube length 160 mm. and oil objective 1/12 inch. As a preliminary, in order to determine a suitable area for counting, the smear, having been covered with a thin film of oil, is first examined under the low power. At the beginning of the spread the cells will be found to be relatively closely packed and at the tail relatively openly distributed, while between these two extremes lies the so-called " usable area " where the count can be made. This area is separated from the dense region and from the tail area by what the author terms respectively the " minimum boundary " and the " maximum boundary," and which he defines as follows : *A. Normal blood*—(*a*) minimum boundary : the erythrocytes should touch or slightly overlap each other ; (*b*) maximum boundary : the erythrocytes should not be more than one average cell diameter apart. B. *Pathological blood*—(*a*) minimum boundary : the erythrocytes should not be more than one average cell diameter apart ; (*b*) maximum boundary : the erythrocytes should not be more than three average cell diameters apart. With the low power, the ocular micrometer square will resolve about 15 times into the 20 mm. width of the smear, and in determining the boundaries of the usable area the criteria given above for these boundaries should be observed in at least 14 out of 15 squares. Having fixed the two boundary lines, a position midway between them and half way across the width of the smear is then found by means of the vernier scale on the moveable stage. At this position the square observed through the oil immersion objective is called the " Optimal micrometer square " of the usable area, and the erythrocytes in this square and in the equal squares lying contiguous to its four sides are then counted. With the optical setting described above, the total number of erythrocytes in the five squares multiplied by 7,200 gives the number of erythrocytes per c.mm. blood. The author states that the results are comparable to those of the ordinary haemocytometers method, the quantitative error being within ±200,000 cells per c.mm. *F. Murgatroyd.*

HARE (K. P.). **On Certain Cyclical Changes observed in the Blood Pictures of Cases of Untreated Anaemia complicating Pregnancy in Tea Estate Coolies.**—*Indian Med. Gaz.* 1939. Aug. Vol. 74. No. 8. pp. 467–469. With 3 charts.

In a paper on anaemia in tea garden labour forces NAPIER stated, in support of a plea for the early administration of iron to pregnant women, that "there is some evidence that these microcytic anaemias become macrocytic during the later months of pregnancy." The present paper presents observations made with a view to testing this statement.

Fifteen anaemic pregnant women were examined at monthly intervals. Six had passed the 28th week of pregnancy before their first examination, but this was not important as none of them showed any tendency to a true macrocytic anaemia; three who did suffer from macrocytic anaemia were already macrocytic when first examined at the 20th, 22nd and 25th week respectively; of the remaining six, none showed any permanent change from true microcytic to true macrocytic anaemia, or *vice versa*. No evidence was obtained therefore to support the suggested transformation, but certain other interesting changes were seen in six cases. These women were examined at intervals of at least four weeks on at least three occasions before delivery, which did not occur until full-term, and none of them received any anti-anaemic treatment. In five cases the mean corpuscular volumes fell, reaching minimal values somewhere between the 28th and 36th week of pregnancy, while in the sixth there was a high value at the 32nd week with low points at the 28th and 36th weeks. That is, in the majority of cases there was a tendency for the cells to be normocytic about the 28th and 36th weeks of pregnancy and microcytic during the intervening period. The mean corpuscular haemoglobin in five cases showed low values between the 28th and 36th weeks, but in the sixth case the curve was reversed, as for the M.C.V., with a high point at the 32nd week. Thus the majority of cases were markedly hypochromic during the period between the 28th and 36th week while round about the 28th and 36th week the anaemia was less hypochromic. The values for corpuscular haemoglobin concentration were variable and the saturation of the cells with haemoglobin did not appear to follow a definite curve. These irregularities may be due to the rapidity with which alterations in volume and haemoglobin content are taking place; in other words, the blood is in an unstable condition during the latter half of pregnancy. The author suggests that this instability may be correlated with variations in the rate of foetal growth, which is said to be very rapid between the 28th and 32nd weeks of pregnancy and to slow down enormously between the 32nd and 36th weeks. If the mother's intake of iron, calcium and vitamin B complex remained steady, increased foetal demands at certain times might render the intake deficient and be reflected in haematological changes. Whatever be the explanation, the variations recorded in untreated women demonstrate the need for care in interpreting changes following treatment in pregnancy. *F. Murgatroyd.*

RODRIGUEZ-MOLINA (Rafael). **Tropical Macrocytic Anemia in Puerto Rico. Report of Two Cases.**—*Puerto Rico Jl. Public Health & Trop. Med.* 1939. Dec. Vol. 15. No. 2. pp. 177–183. [Spanish version pp. 184–190.]

This paper records the clinical and laboratory findings in two cases of

macrocytic anaemia in non-pregnant mulatto women. The first was a hyperchromic anaemia and was thought to be due to a nutritional deficiency, the basic articles of the patient's diet being rice, beans and native tubers, while meat, dairy products and fresh vegetables were rarely eaten. The character of the stools, the absence of intestinal symptoms and the presence of gastric hydrochloric acid were against a diagnosis of either sprue or pernicious anaemia. Improvement occurred after treatment with liver extract but the patient soon relapsed after leaving hospital, perhaps because of her age and economic circumstances. In the second case, the anaemia was hypochromic and an iron deficiency seemed to be the complicating factor as improvement failed to occur until treatment with iron was added.

F. Murgatroyd.

McKenzie (Alan). **The Influence of Hospitalisation upon Weight and Haemoglobin.**—*East African Med. Jl.* 1939. Sept. Vol. 16. No. 6. pp. 210–219. With 1 fig.

In Tanganyika Territory the dietary habits of the tribes are so diverse that it is improbable that any general standard can be defined. Of the patients admitted to the Morogoro hospital 723 were, however, roughly classified into three classes ; (A) the native general population ; (B) the estate labourers ; (C) the better class natives. Of these the first two rarely eat meat, the last consumes relatively large quantities. The patients were further classified according to disease groups.

The diet in the Morogoro hospital was found to average 2,470 calories per man day, with 80 gm. protein (of which 23 gm. are of animal origin) per day.

The patients were weighed on admission and discharge and an estimation of haemoglobin percentage was made at the same times. It was found that in classes A and B the mean gain in weight was between 4 and 5 lbs. ; in class C (heavier on admission) it was less than 1 lb. The largest gain (over 6 lbs.) was found to be in the group of tropical ulcer patients.

" As the gains of class C are so much lower than those of A and B it appears reasonable to assume that the figures are more closely related to the state of nutrition prior to admission to hospital and are a measure of the degree of malnutrition that then existed." The influence of height was estimated in 222 patients and the difference in weight in these patients was still found to be highly significant in the same groups as before. The high increase in the group of tropical ulcer patients was taken as evidence that in the aetiology of this condition malnutrition, and especially the lack of meat in the diet, is a potent factor. [In this connexion it is stated that estate labourers provide the largest proportion of these ulcer cases. Is it not possible that the conditions of estate work, especially on sisal plantations, may provide more than the usual opportunities for slight wounds or contusions of the legs which may form the starting point of these ulcers ?]

The average gain in haemoglobin over the whole series was 7 per cent. and was again greatest in classes A and B. A group of long term prisoners (whose diet contains 24 oz. meat weekly) was divided into two sections one of which was treated with an average of 6 grains of iron daily. After one month it was found that the haemoglobin in the treated group rose from 81·41 to 91·59 per cent. while the untreated

group remained unchanged. This shows that the iron intake is abnormally low, possibly owing to the deficiency in the diet or to the constant drain by ankylostomiasis, malaria or schistosomiasis. But it is certain that " the almost universal anaemia that exists among Africans can be improved by an increased iron intake, and that among those natives accustomed to eat meat a higher average haemoglobin content is found." Full statistical methods are employed in arriving at these conclusions.

[The author does not make any sex or age distinction in the groups discussed but it is probable that most, if not all, of the patients were adult males.] *C. W.*

Favorite (G. O.). **An Instrument for obtaining Bone Marrow.**—*Jl. Lab. & Clin. Med.* 1939. Nov. Vol. 25. No. 2. pp. 199–201. With 3 figs.

The author describes the instrument, which has the advantage over the usual needle in that the material obtained is much more cellular in composition, and over the trephine in that the procedure is less difficult. It consists of a No. 11 gauge cannula and trocar, which both penetrate the skin over the sternum (usually the gladiolus). The cannula is pressed home to the periosteum and the trocar is then withdrawn and replaced by a drill. A firm turning movement of the drill allows it to catch in the bone and thereafter it will proceed by mere rotation until it reaches a prearranged depth at which its progress is stopped by locking nuts. Further rotation forces the marrow substance into the grooves of the drill, which is then withdrawn and the marrow may be removed for smear or section. The small puncture made is easily closed.

[It is possible that this instrument may be useful in the diagnosis of certain tropical diseases. The instrument is manufactured by the Scientific Equipment Co., Philadelphia.] *C. W.*

Lund (E. E.) & Dennis (E. W.). **Studies on the Intestinal Protozoa of Man in Syria and Lebanon. II. A Survey of the Incidence and Distribution of Intestinal Protozoa in the General Population.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1939. Nov. 25. Vol. 33. No. 3. pp. 319–334. With 3 figs. [13 refs.]

In a previous paper the authors gave an account of the investigation of hospital patients in Beirut, Syria, for intestinal protozoa. In this paper an account of a survey carried out in a number of small towns and villages is given. Generally the incidence amongst the rural population was about twice that of the hospital patients in Beirut itself. The following figures were obtained:—*E. histolytica* 12·9, *E. coli* 31·6, *E. nana* 26·3, *I. bütschlii* 11·47, *G. intestinalis* 10·02, *C. mesnili* 11·95. [See this *Bulletin*, 1938, Vol. 35, p. 577.] *C. M. Wenyon.*

Kmecza (Joseph M.). **The Incidence of Human Intestinal Parasite Infections among Patients in a State Institution of Indiana.**—*Amer. Jl. Trop. Med.* 1939. Nov. Vol. 19. No. 6. pp. 515–530. [34 refs.]

The examination of 565 male and 635 female inmates of the Longcliff State Hospital, Logansport, has shown that 51·8 per cent. were harbouring intestinal protozoa or helminths. The following percentages

were found:—*E. histolytica* 0·2, *E. coli* 31·3, *E. nana* 37·7, *I. bütschlii* 3·2, *G. intestinalis* 1·8, *E. vermicularis* 1·6, while one instance of a *Diphyllobothrium latum* infection was noted. *C. M. W.*

WENRICH (D. H.). **Studies on *Dientamoeba fragilis* (Protozoa). III. Binary Fission with Special Reference to Nuclear Division.**—*Jl. Parasitology.* 1939. Feb. Vol. 25. No. 1. pp. 43–55. With 54 figs. on 2 plates.

The paper describes and illustrates in two plates the process of nuclear division in *Dientamoeba fragilis*. This takes place by mitosis, in which four chromosomes are formed as well as a desmose uniting two division centres which have been developed from a single one. The nuclear membrane remains intact and finally the nucleus divides into two by constriction of the membrane, the two daughter nuclei remaining connected for some time by the desmose. In previous accounts the author described one of the granules in the nucleus as an endosome. It has now been observed that this is actually one of the four chromosomes but it differs from the others in that it is connected with the division centre. Following nuclear division the cytoplasm may divide, but this is usually delayed till a second nuclear division has occurred giving rise to two binucleate amoebae, the forms most commonly encountered in any infection. *C. M. W.*

FONER (Ann). **An Attempt to infect Animals with *Isospora belli*.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1939. Nov. 25. Vol. 33. No. 3. pp. 357–358.

With material obtained from a case of *Isospora belli* infection in Palestine an attempt was made to infect three monkeys, two puppies and one kitten by feeding with oöcysts which had developed to maturity in bichromate solution. In no case did an infection result, though a single ripe oöcyst was found in the faeces of one of the monkeys four days after ingestion of oöcysts. *C. M. W.*

STONE (Wm. S.) & REYNOLDS (Francois H. K.). **A Practical Method of obtaining Bacteria-free Cultures of *Trichomonas hominis*.**—*Science.* 1939. July 28. Vol. 90. No. 2326. pp. 91–92. With 1 fig.

The note describes a technique by which trichomonas may be made to migrate from a bacteria-containing medium along a capillary tube filled with sterile culture medium. Along the capillary tube occur a number of loops or traps which have the effect of permitting the passage of the flagellate but not of the bacteria. The presence of flagellates in the tube can be determined by microscopic examination. Portions containing flagellates can be broken off and introduced, after sterilization, into culture tubes. In this way sterile cultures of the human trichomonas have been obtained on a number of occasions.

C. M. W.

AMOLSCH (Arthur L.) & WAX (John H.). **Histoplasmosis in Infancy. Report of a Case.**—*Amer. Jl. Path.* 1939. July. Vol. 15. No. 4. pp. 477–481. With 4 figs. on 2 plates. [11 refs.]

The case recorded is that of an infant who died at the age of 8 months after an illness characterized by chronic paroxysmal cough, anaemia,

leucopenia, continuous fever, weakness and hepatic splenomegaly. The diagnosis was not established till after death when the organism, *Histoplasma capsulatum*, was found in the spleen which had been removed during life, the only organ available for examination. Subsequently the examination of blood films made during life revealed leucocytes containing parasites. The most striking change in the spleen was a very marked proliferation of the reticulo-endothelial cells. The present case of this disease brings the total number on record to 10, of which 8 were in adults. *C. M. W.*

Shaffer (Frank J.), Shaul (John F.) & Mitchell (Reginald H.). **Histoplasmosis of Darling. Fourth Case to be reported in United States.**—*Jl. Amer. Med. Assoc.* 1939. Aug. 5. Vol. 113. No. 6. pp. 484–488. With 4 figs.

The case described is that of a child 11 months old who died of a febrile condition associated with enlargement of the liver and spleen and anaemia. A diagnosis was not made till after death, when the characteristic parasites were discovered in the organs. *C. M. W.*

de Monbreun (W. A.) assisted by Katherine Anderson. **The Dog as a Natural Host for** *Histoplasma capsulatum*. **Report of a Case of Histoplasmosis in this Animal.**—*Amer. Jl. Trop. Med.* 1939. Nov. Vol. 19. No. 6. pp. 565–587. With 3 plates. [20 refs.]

The case reported is that of a bull terrier belonging to a physician of Nashville, Tenn. The animal became ill and developed a condition which was diagnosed as cirrhosis of the liver with ascites. Blood-stained fluid was withdrawn from the peritoneal cavity on several occasions. A laparotomy was performed and a portion of the greatly enlarged liver was removed. In sections of this the characteristic changes together with the parasite of histoplasmosis were found. Cultures were obtained from the blood before death and from the organs at the post-mortem examination and with them other dogs were infected and the disease reproduced. It was clear that the organism was *Histoplasma capsulatum* and that the case reported is the first instance of the disease occurring naturally in an animal.

C. M. W.

Negroni (P.) Estudio micológico del primer caso argentino de *Histoplasmosis*. [**Mycological Study of the First Case of Histoplasmosis in the Argentine.**]—*Folia Biol.* Buenos Aires. 1938. Sept.–Oct.–Nov.–Dec. Nos. 90–91–92–93. pp. 390–391.

From a case of histoplasmosis to be described by Negroni, Balina and Herrera, cultures of the organism *Histoplasma capsulatum* were obtained. In this short note the author gives the cultural characters on various media he has employed for its cultivation. *C. M. W.*

RUDDOCK (John C.) & HOPE (Robert B.). **Coccidioidal Peritonitis : Diagnosis by Peritoneoscopy.**—*Jl. Amer. Med. Assoc.* 1939. Dec. 2. Vol. 113. No. 23. pp. 2054–2055. With 1 fig.

A Japanese, aged 35 years, born in Hawaii, came to hospital at Los Angeles complaining of abdominal pain and swelling dating from two weeks before. He was a heavy drinker. The abdomen was distended with fluid, and the diagnosis made was Laënnec's cirrhosis of the liver. Four litres of straw-coloured fluid were removed, but it re-accumulated in a few days. Exploratory operation revealed dense adhesions of omentum and peritoneum with miliary tubercles, which on section were found to consist of *Coccidioides immitis*, and this was also cultivated. For the next three weeks the patient was subjected to repeated paracenteses and ran a septic temperature to 100°–102°F. Then pleural effusion developed ; this was aspirated and culture again demonstrated Coccidioides. Death took place five weeks after his first admission. At autopsy there was generalized peritonitis, and bilateral pleurisy, both coccidioidal in nature, and a similar infection of spleen, liver and left kidney. The patient denied having lived in San Joaquin Valley. *H. H. S.*

YEGIAN (Diran) & KEGEL (Richard). *Coccidioides immitis* **Infection of the Lung. Report of a Case resembling Chronic Pulmonary Tuberculosis.**—*Amer. Rev. Tuberculosis.* 1940. Mar. Vol. 41. No. 3. pp. 393–397. With 7 figs.

A married woman of 25 years of age complained of cough of three years' duration. Her mother is said to have died of phthisis. From the age of 4 to 11 she lived at Tulare, St. Joaquin Valley, California. She then went to New York and six years later was married. After the birth of a child she felt persistent fatigue and lost weight, she suffered from cough and was told she had pulmonary tuberculosis. X-ray showed scattered shadows. Sputum was blood streaked and twice she had a copious haemoptysis—100 cc. at one time and eighteen months later 60 cc. Repeated examinations failed to reveal any tubercle bacilli but spores were seen which grew on Sabouraud's medium and proved to be *Coccidioides immitis*. Prolonged treatment at a sanatorium resulted in no material change in her condition, but there was some clearing of old lung shadows and formation of new ones.

It is thought that the infection was acquired during her stay in St. Joaquin Valley, though no symptoms were noticed till six years later. *H. H. S.*

VASSALLO (S. M.). **Creeping Eruption.** [Correspondence.]—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1939. Nov. 25. Vol. 33. No. 3. p. 359.

In Zanzibar the author successfully treated 22 cases of creeping eruption with X-ray radiation. Only two required a second treatment. The data are : 70 kilovolts, 5 milliamperes through a 5 mm. filter, tube distance 30 inches, time of exposure 30 seconds. Irritation is allayed in a few hours and there is no sign of the larva after three days. Other treatments had previously been unsatisfactory. *C. W.*

REVIEWS AND NOTICES.

Manson's Tropical Diseases. A Manual of the Diseases of Warm Climates.—Edited by Philip H. MANSON-BAHR, C.M.G., D.S.O., M.A., M.D., D.T.M. & H. Cantab., F.R.C.P. London, Senior Physician to the Hospital for Tropical Diseases, London, etc. Eleventh Edition, Revised.—pp. xvi+1083. With 18 colour plates, 15 half-tone plates, 364 figures in the text, 6 maps & 28 charts. 1940. London, Toronto, Melbourne & Sydney: Cassell & Co., Ltd. [35*s*.]

Manson's *Tropical Diseases*, as edited by Dr. Manson-Bahr, continues to maintain its place, *facile princeps*, among manuals of the diseases of warm climates. Tropical medicine, not only in its entomological, protozoological and helminthological aspects, but also in the clinical and therapeutic, is making continual advances, now with faltering steps, anon with rapid strides, and who could gauge its progress better than a physician in busy practice and especially one who combines at all times clinical observation with pathological investigation? We cannot give greater praise than to say that the standard of former editions has been fully upheld in this, the most recent issue. By judicious employment of small type and by re-arrangement, evidently carefully considered, and by cautious elimination of dead wood, new matter published in the past four and a half years, since the tenth edition was issued, has been incorporated without materially adding to the size of the book, which is only 80 pages larger than the edition of 1935.

Two excellent chapters on Life in the Tropics have taken the place of the Introduction of previous editions. The first contains valuable hints to those whose duty it may be to examine as to their fitness for life in the tropics persons going abroad either for the first time or on their returning thither after a period of leave. The physiological and the pathological effects of climate are briefly but adequately discussed. The second chapter considers clothing and general hygiene and nutrition. The remarks on diseases of temperate climates as influenced by tropical conditions are of the greatest interest, but it is not easy to see why sickle-cell anaemia, Cooley's anaemia and the anaemias of pregnancy should be dealt with in an introductory chapter on Life in the Tropics any more than, say, hookworm anaemia or ectopic gestation. Perhaps it was difficult to find a fitting place in the body of the work, unless a separate chapter on anaemia in the tropics were written and this would not be easy if the vain repetition of the heathen were to be avoided.

To come to matters of more detail. The malaria and blackwater fever sections have been subjected to considerable re-arrangement so that, though new matter has brought it fully up to date, by placing some of it in the protozoological section of the appendix, together they occupy twenty pages less in the body of the work than they did in the previous edition and this tends to facilitate study and revision. The illustration of the method of spleen palpation (p. 96) is retained and is, typically, German in origin; the expression on the face of the examiner is clearly that of aggression for protective purposes and on that of the patient a dreaded expectation of rupture of his spleen.

The rash of African trypanosomiasis is depicted on a coloured plate with other rashes, but one misses the very characteristic appearance as presented in the photograph by MACKAY in the previous edition. Under American trypanosomiasis the goitrous type is described in large type and the points which have been urged against this being a form of Chagas's disease are given in small type. Not merely the balance, but the great weight of evidence is against the existence of such a goitrous form of the disease and it would seem more equitable if the large and the small types changed over. It is, perhaps, too early yet to discard altogether the classification into goitrous, myxoedematous, pseudomyxoedematous and so on, since these accompaniments do occur in " Chagas " localities. The number of vectors also is much greater than is stated ; in Mexico alone fifteen species of Triatomidae have been proved to be capable transmitters and nine of them infected in nature ; according to LENT and PIFANO twenty species have already been found naturally infected. In the Oriental Sore section the author's drawing of the lymphatic spread is clearer and more explanatory than the photograph in the previous edition. The synoptical table of the strains of relapsing fever spirochaetes, facing page 212, is an improvement on the old and the same remark applies to the typhus table on pp. 252–53. The reaction of the serum of Rocky Mountain fever patients to *Proteus X19* is given as negative in this table, but in the text is rightly stated to be usually positive ; the strong positive reaction with *Proteus XK* given in the table is not referred to at all in the text. The text is better arranged in the new edition and a section on the Q fever of Australia has been included.

Omission of the charts of the different temperature forms in the initial weeks of attack of undulant fever is, perhaps, to be regretted, for those with little experience in the tropics may be led away by failure to recognize that the fever is not always according to type.

As regards pyelitis and *Bacterium coli*, recent work by LEISHMAN has shown that pyelitis in women is not due, at all events not solely due, to the propinquity of the renal pelvis to the colon, but that it is significantly associated with looseness of the bowels and that the condition arises most probably as an ascending infection *via* the urethra.

The account of yellow fever is good and brought well up to date ; mention might have been made of disinfection of aircraft *during* flight.

The preliminary statement on vitamins (pp. 425–34) is very useful and informative. It will be noted that epidemic dropsy has been removed from the vitamin deficiency section and transferred to that of diseases due to vegetable poisons. In the account of this disease no mention is made of Colonel Kenneth MCLEOD whose masterly description of the earliest known outbreak at Calcutta and Howrah in 1877 left little to be added to the clinical side, nor is anything said of sialkata or katakar oil, synonyms of Argemone oil, obtained from odissimari, the seeds of *Argemone mexicana*, which is becoming more and more directly incriminated as study of the causation of epidemic dropsy progresses. Allylisothiocyanate, which the author refers to as causative, has been ruled out by the work of LAL, AHMAD and ROY in 1938. Some may think that reference at least to various " pellagroid " conditions such, for example, as epidemic glossitis of Dakar and Senegal, decocquée of the Seychelles, and kwashiorkor of the Gold Coast, should not be omitted.

As would be expected in a work edited and largely written by Dr. Manson-Bahr, the chapter on the Dysenteries is exceptionally good, for his knowledge and experience of this group are probably greater than those of any other English writer. The coloured plate of acute Sonne dysentery, comparing this condition with that of the amoebic and Shiga varieties, could hardly be surpassed. The existence of amoeba cyst-passers in England, Holland, New York, Philadelphia and Egypt is mentioned, but not the work of MacAdam in India and Mesopotamia where he found in one series 5·2 per cent., and in another 12·3 per cent. of persons examined to be passing cysts of *E. histolytica* although they gave no history of any previous dysentery; nor of Jamaica where amoebic dysentery and amoebic hepatitis are hardly ever met with, but 14·7 per cent. of healthy persons examined were found to be cyst-passers. The new illustration of amoebic granuloma of the abdominal parietes (p. 563) is important and interesting, for unless attention is called to the condition practitioners are apt to forget that such a thing exists.

Seeing that more and more medical men, in particular those who have not practised in the tropics, are reporting cases of idiopathic steatorrhoea as "non-tropical sprue," it would, perhaps, have been well to lay more stress on the *differences* between this and tropical sprue than on the similarities which are indicated (p. 580). The views of unicists and dualists regarding the syphilis-yaws controversy might have been put more forcibly and clearly. The author who, we believe, is more on the side of the dualists is more than fair to Admiral Butler's unicist views, leaves him, as it were, master of the field instead of marshalling the evidence *pro* and *contra* in a judical summing up. Bejel or "non-venereal syphilis of the Arabs" is an important disease epidemiologically and pathologically and deserves more than three lines on p. 619 under yaws, and another three (p. 633) under the juxta-articular nodules section. In the section dealing with venereal diseases, one chapter is devoted to climatic bubo, lymphogranuloma inguinale, and one to ulcerating granuloma of the pudendum or granuloma venereum. To give an illustration, and one moreover remarkably well reproduced, of the pathology of the latter and to label it granuloma inguinale (which is not a synonym of either disease) leads to confusion. A new short chapter on encephalitis japonica has been introduced. "No treatment is of any avail" it is stated of leucoderma. If the recent successes recorded by Panja and Maplestone from the use of intradermal injections of bouchi oil, extracted from the seeds of *Psoralia corylifolia* are substantiated, such a pessimistic outlook will no longer be warranted.

The description of *veld sore* as a shallow ulcer covered with a thin grey pellicle is, in the reviewer's experience more correct, or more frequent on the African veld at least, than the fungating mass depicted (p. 681). A large number of these were seen by the reviewer in the Boer War, mostly on the legs and starting in abrasions caused by the hard stubble; they were very indolent and intractable until tampons of antiserum were used as dressings; they then cleared up quickly and had no paralytic sequelae. As regards *pinta*, Pardo-Castelli is quoted as suggesting that many of the lesions ascribed to pinta are in reality depigmented areas due to syphilitic infection (see also this *Bulletin*, 1937, Vol. 34, p. 250). The question, however, is not so simple as this. Brumpt, quoting the previous findings of Alfonso & Gran y Triana of Cuba and Leon y Blanco of Mexico,

describes a spirochaete in the skin and superficial lymphatic glands of pinta cases, resembling *S. pallida* (this *Bulletin*, 1940, Vol. 37, p. 104). The Wassermann reaction is usually positive in pinta. PARDO-CASTELLO expresses the view that pinta bears the same, or a similar, relation to syphilis as does yaws. More recently, LEON Y BLANCO has found virulent spirochaetes in the sweat and discharges over an exfoliated site, but he showed that there was no cross-immunity between pinta and syphilis, since primary syphilis may occur in a pinta subject and *vice versa*.

Another important addition is a section on *rhinoscleroma* with an excellent illustrative photograph of a patient. In the *onyalai* section (p. 712) more stress might be laid on the resemblance and possible connexion between it and thrombocytopenic purpura. The decrease in platelets, the prolonged bleeding time with normal coagulation time and the results of autohaemotherapy may afford a basis for future research, especially when we bear in mind the views of American workers that thrombocytopenic purpura is a manifestation of food allergy. In the chapter on vegetable poisons mention should be made of the work of LEIGH EVANS and ARNOLD in 1938, with evidence in support of, if not actually confirming, the suggestion made by SCOTT in 1915 that the active toxic principle of *Blighia sapida* is a saponin.

The list of snail and fish intermediaries of Clonorchis (p. 898) is another new and important addition ; also the Onchocerca illustrations on pp. 786 and 787.

Omissions which will, we think, be regretted by readers are *Coccidioides immitis* and San Joaquin Valley fever, Jake paralysis among food poisonings, and, more than these, the chapter on the technique of intravenous injections, on the estimation of haemoglobin and the colour index, and on dark-ground illumination. All these last should, of course, be taught in the classes of instruction for those going to the tropics, or even earlier in the ordinary medical curriculum, but we feel fairly safe in saying that, though taught, they are not learnt. We ought not, however, to grumble at a few omissions in a book crammed full of good things ; moreover, we are given instead the examination of the urine in malaria and the testing for quinine and atebrin, really perhaps of greater importance where saving of space is a desideratum. The author—for Dr. Manson-Bahr now carries out more than the editorial functions which is all he modestly claims—has often orally acknowledged his indebtedness to the *Tropical Diseases Bulletin*, but this does not yet find expression in the preface among the other acknowledgments in the present edition any more than it did in the tenth.

Misprints are very few and nearly all those in the previous edition have been corrected. There still remain haemotobia, morocanus, Sovensen, Pfeifferia, demyelated, hyperpyesis ; Lathyrus surely is feminine, and has Wucherer a modified " ü " ? If the name is derived from the trade (or is it a profession ?) it should be Wucherer. But these are matters of little moment. It is good to see " aetiology " properly and correctly spelled throughout the new edition. The fact remains that in this eleventh edition we have an authoritative work which, for its size, accuracy of detail, balance of information and clarity of exposition is unsurpassed. The work should be in the hands of every practitioner in the tropics and we feel certain that the interval between this and the twelfth edition will be shorter than that between the last edition and the present, for it is a work which must not be allowed to go " out of print." *H. H. S.*

FAR EASTERN ASSOCIATION OF TROPICAL MEDICINE. **Comptes-Rendus du Dixième Congrès, Hanoi, 26 Novembre–2 Décembre 1938.** [Proceedings of Tenth Congress, Hanoi, 26 November–2 December 1938.]—Volume I. pp. lxxii+1057. With numerous plates, charts & tables. 1939. Hanoi: Imprimerie d'Extrême-Orient.

This is volume I of the Proceedings of the Tenth Congress of the Far Eastern Association of Tropical Medicine which was held at Hanoi from 26th November to 2nd December, 1938. It is a handsome book over 1,100 pages, and the contents are subdivided into two main parts, the first dealing with the business matters of the Congress, the second with the many scientific communications. The latter, in this volume, are divided into six sections devoted to: Cancer, General Hygiene, Nutrition, Pharmacology, Anthropology, and Surgery, to each of which several papers were contributed and are here printed in full. Altogether, 75 articles are reproduced. A few which have been issued separately have already been abstracted or noticed in this *Bulletin*, others sum up past knowledge and do not call for special detailed mention here. Some, however, bring forward new facts or fresh considerations and, consequently, the most important must be referred to. Much as we would like to do so, we cannot in the space at disposal deal adequately with them all. Most of those calling for special notice come in the Nutrition section. A very informative article on the Nutritive Value of Rice by Professor ROSEDALE will be abstracted separately in a later number of this *Bulletin*. Another by Colonel TOULLEC summarizes clearly our knowledge of the symptomatology of beriberi or of deficiency of vitamin B_1. He divides the symptoms conveniently under digestive disturbances, cardiovascular, oedema, endocrine upset, and nervous conditions. Dr. MEYERS of Sumatra contributes an interesting note on the oedema of beriberi. He discusses again the question of toxin in beriberi production and states that there are two possibilities: one, that the polyneuritis is the direct result of aneurin deficiency, or, secondly, that there is a reduction of it to such a degree that the action of a toxin is facilitated. If aneurin effectively "cures the disorder which produces oedema," there must be some unknown factor of an endogenous rather than exogenous character which causes the oedema, and in support of this thesis he mentions the fact that beriberi patients may show oedema for some days and that this may spontaneously disappear. It is not clear (to the reviewer, at least) that there "must therefore be present in the organism some unknown regulating factor capable of inhibiting the oedema."

Dr. H. C. HOU of the Lester Institute, Shanghai, contributes an article of more than local interest on the incidence of beriberi in Shanghai, its types, and the results of treatment with vitamin B_1, estimating the blood pyruvic acid and the urinary excretion of the vitamin at frequent intervals. He analyses the results in 674 cases of acute and chronic beriberi, divided into five main groups, namely, latent, mild chronic, subacute, acute, and chronic paralytic beriberi. In acute beriberi energetic symptomatic treatment, with adrenalin or coramin, for example, is essential to tide over the critical interval before the effect of the vitamin B_1 can manifest itself, some 6–12 hours.

Other contributions of particular value include one by HUARD and MEYER-MAY on Liver Abscess in Indo-China, an interesting

compilation amply documented by close on 150 references and with several clear drawings. Another by CHIEN-LIANG, HSU and FA-CHU CHANG on an X-ray Study of the Lung and Pleura in Amoebic Abscess of the Liver, giving details of several cases illustrating particular points and a discussion of six cases. As many as twelve showed normal lung and pleura, but the diaphragm was raised in seven of them. The X-ray photographic reproductions in this article are unfortunately too poor to reveal much of value, in spite of a detailed descriptive text. Another brief article deals with hepatic and pulmonary ascariasis and the difficulties in its diagnosis. One on the Visualization of Amoebic Liver Abscess by Drs. HUEI-LAN CHUNG, F. Y. KHOO and S. K. P. CHANG has been separately abstracted for this *Bulletin* [1939, Vol. 37, p. 119]. Let us hope that the second volume, if one is to be published, will appear before the contents have time to become out of date. If the standard of this volume is maintained, the whole will constitute a valuable work of reference on the progress of tropical medicine. *H. H. S.*

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